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The Federal Role in the Conservation and Management of Private Nonindustrial Forest Lands

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The Federal Role in the Conservation and Management of Private Nonindustrial Forest Lands

An Interagency Committee Report
U.S. Department of Agriculture
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HIGHLIGHTS

The President's Environmental Message of May 23, 1977, directed the Secretary of Agriculture to " . . . undertake a comprehensive study of the Cooperative Forestry Programs." The study was to " . . . examine the desirability of providing financial assistance to State forestry agencies on the basis of State forestry plans rather than through the present fragmented approach and should consider the need for measures to:

- assure that forestry programs support national environmental goals;

- assure that assistance to forest owners will emphasize interdisciplinary planning and multiple-use planning;

- improve the capability of private forest lands to meet the Nation's need for wood;

- prevent and control pollution, fires, insects and diseases that damage forests, using environmentally sound methods, such as biological pest controls;

- improve and maintain fish and wildlife habitat, particularly those that are critical for threatened and endangered species;

- strengthen planning and management capabilities of State and local forestry agencies."

A Detailed Fact Sheet, released by The Council on Environmental Quality on the same date, indicated that the study additionally should examine the major factors important to long-term forest land conservation, evaluate effectiveness of forestry information and technical assistance programs, and propose means of maximizing net public benefits from forestry assistance programs " . . . without unduly interfering with private decisionmaking."

The following report is an initial response to the President's directive. It includes:

- a brief review of the national importance of private nonindustrial forests;

- a discussion of the principal factors which may inhibit resource management on these lands; and

- a discussion of approaches available to the Federal Government to stimulate the conservation and management of private nonindustrial forest lands.

This report does not comment on the roles of the concerned Federal Agencies nor does it make specific program recommendations. It does define the kinds of Federal activities that promise to be most productive.

Importance of Private Nonindustrial Forest Lands

Farm and other private nonindustrial ownerships in the United States include about 59 percent of the land that has been classified as "commercial forest land"--forest land presumed capable of growing at least 20 cubic feet per acre per year of industrial timber products. In addition to commercial forest land, these classes of ownerships include millions of acres of noncommercial forest. These lands produce a significant share of the Nation's timber, provide habitat for much of the wildlife population in America, are important watersheds, support substantial livestock herds, and provide recreational opportunities for many more people than the 4 million or so landowners. The management of these lands has important implications for the Nation's environmental goals.

Timber production

Nonindustrial private forest ownerships contain 26 percent of the softwood and 71 percent of the hardwood growing stock inventories of the United States. They have supplied even larger proportions of the harvested wood--38 percent of the softwood and 76 percent of the hardwood harvest in 1970. Their importance is greatest in the East, where nearly three-fourths of all commercial forest land belongs to farmers and other nonindustrial owners. As old-growth timber inventories in the West continue to decline, these eastern ownerships will increase in importance.

The potential for increasing timber growth on nonindustrial private ownerships is large. The management opportunities on these lands often appear to be more cost-effective in terms of potential growth increases than those on the National Forests.

Hardwood production can be increased through improved management of existing stands, protection activities and marketing. To increase softwood production there are additional opportunities, especially tree planting.

Wildlife habitat

Forest lands provide habitat for about two-thirds of all species of birds and mammals in the United States. Diversity of species is especially great in the northern hardwood forests, which are concentrated in nonindustrial private ownerships. Birdwatching, wildlife photography, hunting, and fishing have become increasingly popular in recent decades, and use of private land for these activities is likely to expand. Habitat protection is especially important for species that have been classified as "endangered" (in danger of becoming extinct) or "threatened" (likely to become endangered). The extent to which endangered and threatened species depend upon private nonindustrial forest habitats is uncertain, but many of these species exist in eastern forest types, where private nonindustrial ownership is extensive.

Major opportunities for habitat manipulation occur in conjunction with timber harvesting. The effects of timber harvest upon wildlife habitat can be negative or positive--depending upon the forest type, the wildlife species concerned, and the harvesting technique used.

Water resources

In the East, water supplies generally are adequate. The most important concerns are protection of general watershed values and water quality--especially during logging and land development. A few critical watersheds in the West involve private ownerships.

The major opportunities for protection and enhancement are associated with timber management, especially tree planting to stabilize eroding watersheds and carefully selecting environmentally safe silvicultural techniques.

Forested range

As demand for meat grows, use of forested range is likely to rise. Forage production could be increased significantly through vegetative manipulation. Cost-effective opportunities are probably greatest on relatively large ownerships (500 acres or more). Integration of grazing with the production of timber, wildlife habitat management, and watershed management generally would be technically feasible, but would require careful planning.

There are probably few cost-effective opportunities to provide direct financial assistance to landowners for improvements of forested range. The principal opportunities lie in broad education and technical assistance.

Outdoor recreation

Nonindustrial private forest lands are extensively used by the public. These ownerships include large acreages along streams and lakeshores and other points having high recreation value. Often these acreages are near population centers on well-traveled highways. While owners have capitalized on recreation as a business by charging fees for camping, picnicking, hunting, and other uses, most of the dispersed recreation visits on private forest lands are free of charge--often without the consent of the owner.

Some States have purchased easements for public access for hunting, fishing, boating, and other uses. Perhaps the most useful Federal approach would be to encourage States in programs of this nature. In addition, general education and technical assistance programs--operated through State agencies--should inform landowners about the potentials and realities of recreation management as part of an integrated forestry program. Some private lands are involved in the National Wilderness System, the National Trail System, and the Wild and Scenic Rivers System, and some include areas of special public interest for ecological, geological, archeological, or historical reasons.

Problems Inhibiting Forestry on Private Nonindustrial Lands

Although farmers and other nonindustrial owners control a very large share of all the forests in the United States and produce large proportions of all the major forest resource outputs, available data suggest that they invest little money in forest management, aside from land purchases and property taxes. A basic reason, historically, has been low returns relative to investment costs. Other factors that discourage investments in conservation and management include:

- higher interest costs on borrowed or invested money than can be recovered from investments in forestry,
- unacceptable time lags between investment and returns,
- lack of liquidity of forestry investments for unacceptably long periods of time,
- risk of losses to fires, insects, diseases, or trespasses that cannot be accepted or insured against,
- burdensome tax laws regarding forest management activities,
- difficulty in finding equipment and training workers for jobs such as tree planting or timber stand improvement, and
- high management costs and market disadvantages because of the relatively small acreages held by these owners.

Lack of information on forestry practices is frequently cited as a problem. Even when owners are aware of harvest opportunities, it is not at all clear that they have sufficient market information to command competitive prices for their timber or that they are well informed about forestry opportunities other than harvesting.

A particularly important problem on these ownerships is the great preponderance of hardwoods they contain--typically of sizes, species, and qualities for which there is little market demand.

Private Sector Approaches

Forest industries have undertaken many different initiatives to help improve the productivity of small forest ownerships. Some large firms have developed long-term leases of private ownerships with the right to manage and harvest the crops grown. More firms have engaged

in providing direct management assistance to small landowners, usually in return for the right of "first refusal" on bids to harvest timber, and industry sources report that the number of firms with landowner assistance programs is increasing.

The number of consultants serving small landowners has been increasing. They provide services similar to those of public service foresters, but they also market forest products and arrange for equipment and labor to get forestry work done. The greatest growth in the number of consultants appears to be occurring in the South, where there is a large and vigorous market for softwoods and hardwoods.

Federal Approaches

A number of studies have evaluated specific Federal programs. In general, these studies support the present types of efforts, but numerous recommendations have been made to redirect or strengthen particular programs.

This report develops a methodology for evaluating approaches that are available to the Federal Government to encourage and assist in the conservation and management of private nonindustrial lands. Criteria were written that both address the concerns of the Environmental Message and provide a basis for measuring the cost-effectiveness of those approaches. A subjective appraisal of the possible approaches based on those criteria is presented.

The approaches fall into four groupings: Education, technical assistance, incentives, and assistance to States in developing State forestry plans. In total, these approaches provide adequate room to satisfy all the concerns in the Environmental Message.

General education programs to inform landowners of opportunities for protecting and managing their lands in an environmentally sound manner and of sources of assistance are relatively inexpensive and a prerequisite to success in gaining wide participation in other programs. A good educational program provides the landowner a rational basis for deciding how to manage his land--whether to more fully develop any particular resource potential or to enjoy it in its undisturbed condition. Education also helps the public at large to understand the environmental considerations and alternatives in the management and protection of all forest resources.

Technical assistance and services must be available to the landowners who decide to actively manage their forest resources. As a group, nonindustrial landowners do not have the skill or equipment or management or market information necessary to successfully carry out management activities; nor are they capable of protecting their lands

from losses from fires, insects, diseases, or trespass. Frequently, they do not understand how one forest resource use can complement another. Measures should be taken to ensure the local availability of technical services. To improve the delivery system, applying the priority-of-service concept to all programs and encouraging the formation of groups of landowners would have high payoffs. The needs for all kinds of technical assistance and services would increase if incentive programs were expanded.

Incentives through cost-sharing are relatively expensive in terms of Federal expenditures, but they have high cost-effectiveness and lead to large impacts on the ground when properly designed and administered. There are many opportunities to stimulate timber production on private nonindustrial ownerships through cost-share programs at a lower per-unit-output cost to the Federal Government than on the National Forests. In fact, the total costs of such timber production--public plus private costs--will often be less on these ownerships.

Effective expansions of incentive programs require similar expansions in educational and technical assistance programs. In addition, if priority-of-service based solely on environmental and resource management objectives (rather than also being designed to meet other national objectives) could be followed and/or if certain other changes were made, the impacts on resources of incentive programs would increase significantly.

Experience shows that while substantial increases in stumpage prices do lead to increased timber harvests, they do not lead to much greater investments in tree planting or other management activities by the owners of nonindustrial forest lands. But experience in the Soil Bank Program also indicates that these same owners will substantially increase such investments when stimulated by cost-sharing or other direct incentives--when such programs are operated on sufficiently large and stable bases.

Changes in tax policies and credit availability require further analysis, in cooperation with other units of government, before conclusions can be drawn.

State forestry planning should be encouraged because it is a cost-effective means of guiding expenditures of Federal and State funds to achieve both environmental and forest management goals. It must be recognized that specific approaches best for one geographic area may be considerably different from those suited to another area. State forestry plans permit States to select the approaches that work best for them. Federal help to States to strengthen State planning efforts can also result in better coordination between agencies and a more effective combination of approaches at the State level.

Cooperative planning has been critical to a wide range of programs including fire, insect and disease control, incentive programs, technical assistance to landowners, and education. A new step would be to work with the States to develop a "model State plan" that would provide an acceptable vehicle for Federal funding. Within the Federal establishment, this would require defining exactly what is wanted and ensuring that Federal efforts are coordinated with such a plan.

It is apparent that both the implications of specific programs to the concerns of the Environmental Message and the cost-effectiveness of such programs depend upon the manner in which activities are conducted on the ground. It is recommended that any program should be implemented in accord with the following principles:

- All Federal expenditures must be made in a manner supportive of laws relating to national environmental goals.

- As a minimum, adequate protection will be provided to forest, soil, air, and water resources, and to critical habitats of threatened and endangered species of flora and fauna.

- Programs should favor stimulating the joint production of marketable and nonmarketable goods and services, with emphasis placed on "best management practices."

- Priority-of-service guidelines should be developed for each program based on

  -- landowner receptivity to the program,
  -- cost-effectiveness of accomplishing program objectives, and
  -- sensitivity of areas to environmental degradation.

- Preference should be given to spending Federal dollars in a manner that strengthens the capabilities of State and local agencies.

- All programs should be monitored and a data base adequate to support critical evaluation and redirection kept current.

INTRODUCTION

As a followup to his Environmental Message, the President directed the Secretary of Agriculture to conduct a comprehensive study of Federal activities concerned with privately owned forest lands (see appendix A). This report is in response to that request.

The President has specifically directed that the following, closely related considerations be included in this study:

Strengthening planning and management capabilities of State and local forest resource agencies.--The continuing trend over the past several decades of increasingly stronger State and local organizations is one result of a considerable cooperative effort to develop the necessary know-how to manage their forest-related programs. This strengthening has been a necessary precondition to the States taking a leadership role in conducting statewide forest resource planning activities. Further strengthening will lead to more effective management of non-Federal forest lands.

Funding State forestry agencies on the basis of comprehensive State forestry plans.--In the past, Federal assistance to both States and landowners has been fragmented through a variety of laws and regulations. It is timely to review the possibility of consolidated program support to States that would be aimed at targeted accomplishment objectives and provide more efficient program administration. Only through comprehensive plans that identify priorities can a cohesive approach to resolving the environmental, social, and economic needs related to forest lands be achieved. If plans and programs developed by the State are to serve as vehicles for Federal funding, they must be consistent with Federal laws such as the Water Pollution Control Act, the Coastal Zone Management Act, the Clear Air Act, the Endangered Species Act, and the National Environmental Policy Act.

Designing forest resource programs that support national environmental goals.--Programs to improve resource protection and management must emphasize the entire forest environment. Critical wildlife habitat, esthetic values, air and water quality, water quantity, and all the other attributes of forest environments can be enhanced through comprehensive and coordinated assistance programs.

Emphasizing multiple-use management.--It is rare that forest land can produce just one kind of benefit; the potential to provide combinations of goods and services nearly always exists. Private nonindustrial lands already provide a major share of all the Nation's forest resource values. They have the physical potential to provide much more. Because these lands are frequently close to major population centers, they are particularly critical in providing opportunities for hunting, fishing, hiking, and other environmental benefits.

Increasing wood production on private forest lands.--The 296 million acres of nonindustrial private land make up about three-fifths of the Nation's productive timber base. These private holdings in aggregate are critical to our wood supply--they also are the lands which most need improved management because they now yield only about half of their potential production.

Controlling fires, insects, and diseases.--Programs to reduce losses from wildfires and from insects and diseases have formed the backbone of cooperative forest resource efforts for 40 years. Successful efforts in the past have ensured much more valuable forests today; the increased values and heavier uses of these forests require continuing protection efforts. Urbanization in forest areas and development of second homes have increased the dangers of fire to people and property.

Improving fish and wildlife habitats.--Private forest lands provide millions of hours of recreation centered upon wildlife and fish. Cooperative programs should encourage landowners to develop and protect the habitats of the species that occur on their lands, and special attention should be paid to the very critical habitats of threatened and endangered species.

A major concern of this report is those problems that have impeded the conservation and management of private nonindustrial forest lands and the approaches available to resolve them. There are other facets of those lands that are also important. For example, decreased harvesting on the National Forests would, presumably, cause an increase in general stumpage prices that, in turn, would stimulate more harvesting on private lands. The likely benefits and costs of such a tradeoff, while deserving study, are not explicitly addressed here.

Nor does this report encompass all Federal programs that are important to the producers of private stumpage. Those programs aimed at increasing processing efficiencies and those specifically designed to support and enhance rural communities are excluded.

This report does provide information on:

--the Nation's forest resource situation, with particular emphasis on private nonindustrial forest lands and the general role of the Federal Government on those lands,

--the problems or reasons why forest resources on those lands have not been more highly developed, and

--discussions of actions the Federal Government in cooperation with States and others might take to overcome those difficulties.

A broad view of problems and the approaches available to overcome them has been taken. Specific program activities and units of the Federal Government best suited to carry out such activities have not been defined. Instead, the report provides background information and analysis to serve as a partial basis for improvement or establishment of Federal programs designed to stimulate the conservation and management of forest resources. This report will have to be integrated with considerations of other national objectives before specific program recommendations can be developed.

FOREST RESOURCES AND THE ROLE OF THE FEDERAL GOVERNMENT

In this section, a national perspective is presented for each of the major forest resources. Particular attention is paid to those facets that have previously been defined--through Federal law and through major reports--as being of particular national concern. The general opportunities to improve in those areas, particularly on private nonindustrial forest lands, are discussed. Finally, there is a brief discussion of the general principles that have served as guides to Federal activities undertaken to encourage and assist activities by private landowners.

Forest Resource Situation

About one-third of the land area of the United States is forested. Products and services from those lands are important to the economic, social, and environmental well-being of the Nation. Recent studies suggest that the supplies of some products and services may not grow as fast as the demand for them grows, if present levels of management and trends in forest land use continue. However, the same studies suggest that there are many opportunities to increase supplies.

Forests can produce various combinations of products and services--whether timber and wildlife, livestock and recreation, or water and beauty. Because these resources can be simultaneously produced from the same lands, activities to enhance one have at least the potential of degrading others. In the end, we must address all of the resources and all of the activities on forest lands at one time. Fortunately, much more often than not, it is possible to simultaneously enhance a variety of these resources.

Timber resources

Recent projections suggest that the domestic demand for softwood timber is likely to grow more rapidly in the future than is our capacity to increase production, assuming we continue to manage our forests as we have in recent years. Thus, continued inflation in "real" prices of softwood lumber and plywood on the order of 1.5-2.0 percent per year is expected. Timber landowners should benefit through rises in stumpage prices, but other consequences can be expected, including an increasing reliance on imports and increases in environmental costs resulting from the industrial processing of energy-intensive substitute products.

Most of the major timber supply studies made in the past 10 years have focused on softwood sawtimber--the resource used for most housing and other construction. On the National Forests, which have contained

about half the United States softwood sawtimber, harvests exceeded growth by 174 billion board feet during the past decade; this imbalance is likely to continue for the next several decades. While the old-growth timber inventories of the West have been steadily declining, there has been a substantial increase in smaller sized softwood inventories in the South, largely on private lands. There has been a parallel increase in hardwood inventories in the North--again, largely on private lands.

Table 1 compares commercial forest acreage, inventory, growth, and removals of softwoods for the major classes of owners. The most outstanding facts indicated by this table are:

1. The highest proportion of eastern timber production occurs on farmer-owned and other nonindustrial private lands. The underlying data show that these owners have maintained relatively low volumes per acre. As a percent of inventory, removals are higher from nonindustrial private lands than from any other class of owners in the East. This situation does not hold in the West, probably because timber on nonindustrial private lands there is much smaller size than that being harvested from industry and public holdings. (In eastern hardwood timber, nonindustrial private holdings account for three-quarters of the land, inventory, and growth, and four-fifths of the removals.)

2. Growth and removals are low on National Forests in comparison with proportions of commercial forest acreage or inventory. Growth is relatively low partly because old-growth trees are beyond their most productive ages and partly because of the preponderance of lands of lower productive potential on the National Forests. Rates of removal are relatively low because of public pressures against rapid liquidation of old-growth inventories and because it is not economical to harvest, transport, and process timber in certain areas.

3. Western softwood removals on forest industry lands are very high in comparison to inventory. The 1975 Resource Planning Act (RPA) Assessment indicates that timber removals from western industrial lands will drop substantially in the next 30 years, primarily because of high rates of removals relative to growth on the west coast. This will increase the pressures on nonindustrial lands.

Large old-growth trees, harvested primarily from public lands, will play a constantly decreasing role in meeting the Nation's needs. Since they will not be replaced as such, the question becomes one of meeting those needs with smaller softwoods, and perhaps in part, with hardwoods. This implies that maintaining or increasing National wood production in the long run will require that a much greater share be produced on private lands in the eastern part of the United States.

Table 1.--Distribution of commercial softwood-type forest land and softwood inventories, growth, and removals, by ownership 1970

Section and Ownership	Ownership of commercial forest land in softwood types[1/] (Million acres)	Inventory (Billion cubic ft.)	Growth (Billion cubic ft.)	Removals	
				Total (Billion cubic ft.)	Sawtimber (Billion board ft.)
East:					
National Forest	9	10	.5	.1	.6
Other public	9	8	.4	.1	.5
Forest industry	31	32	1.8	1.2	4.9
Farm and misc. private	88	68	4.1	3.2	11.1
All ownerships	137	118	6.8	4.6	17.1
West:					
National Forest	59	190	1.5	1.9	12.2
Other public	14	40	.6	.6	3.7
Forest industry	12	41	.8	1.9	11.4
Farm and misc. private	20	43	1.0	.6	3.2
All ownerships	105	314	3.9	5.0	30.5

1/ Excludes acreage of nonstocked commercial forest land. Oak-pine type in the east is included in softwood acreage.

Adapted from USDA Forest Service. 1973. The Outlook for Timber in the United States. For. Res. Rep. No. 20.

About two-thirds of the acreage of nonindustrial private ownerships is in hardwoods. These ownerships have consistently provided about 80 percent of hardwood timber supply.

Hardwood timber growth has exceeded removals substantially in recent decades. Between 1952 and 1970, hardwood sawtimber inventory rose 19 percent and growing stock 26 percent. No general shortage of hardwood roundwood is anticipated within this century, although some high-value species such as walnut and cherry have become increasingly scarce.

The private nonindustrial ownerships have depended almost entirely upon the private-market system for the sale of their timber. The available data indicate that the total harvest level from these lands remained relatively stable from 1952 to 1970. This applies to both hardwoods and softwoods and to growing stock and sawtimber.

Stumpage prices received by small landowners for the pulpwood portion of this harvest, when measured in constant dollars or constant purchasing power, have remained practically stable since the turn of the century. This price trend has protected the value of the small owner's standing timber against inflation, but has not provided any additional incentive for increased investments.

The historical stability of "real" prices has been achieved by shifting timber demands for expanding pulp capacity to new sources of supply--including use of previously unused species, building processing facilities in areas having abundant supplies, fuller utilization of harvested trees, and fuller use of waste chips from sawmills and plywood mills. Opportunities for developing new sources of supply appear to be drying up and, therefore an expectation of rising relative prices of pulpwood stumpage may be a reasonable prospect within a decade or two.

Sawtimber stumpage prices for both hardwoods and softwoods have had a strong upward trend in constant dollar terms since 1950. Stumpage prices for southern pine, the principal softwood species held by nonindustrial owners, have doubled in real terms since 1950. For all eastern hardwood sawtimber, real stumpage prices have increased about 50 percent since 1960, and substantially more since 1950. For very select hardwood species such as walnut or cherry, the increase has been much greater. The real increases in sawtimber stumpage prices are largely the result of demands increasing more rapidly than supplies. The outlook is for these trends to continue strongly for softwoods. For hardwoods, the favorable growth-harvest and overall supply situation indicates very little increase in prices generally. However, for the more highly valued species and better grades, upward price pressures will be above average.

In making forest productivity improvement investment decisions, site quality is a critical factor. The soil resources and climatic conditions are the basic elements for defining potentials for wood fiber production. This potential is quite variable within the Nation. It ranges from as low as 5 cubic feet of wood per acre per year in some pinyon-juniper lands of the Southwest to well over 300 cubic feet per acre per year on some lands in the fog belt by the Pacific Coast. A great variability can occur even within regions. In the South, the potential varies from as low as 50 cubic feet (site index 40 for short-leaf pine) to as high as 180 cubic feet (site index 120 for loblolly pine).

One of the major physical opportunities for enhanced timber production appears to be establishing and managing commercially desirable species on selected, high-site lands that are stocked at less-than-optimal levels. Nonstocked acreages in 1970 totaled 20.7 million acres--of which 74 percent were on farm and miscellaneous private holdings. In addition to nonstocked acreages, millions of acres were so sparsely stocked, or stocked with such undesirable trees, that artificial regeneration appeared warranted. For example, an analysis reported in "The Outlook for Timber in the United States" indicated 19.6 million acres were available for regeneration in the Southeast alone. The same analysis identified large acreages considered suitable for treatments that can improve tree growth and quality.

In large areas of the South, research foresters have carefully analyzed the needs for reforestation on private nonindustrial lands, "and conclude that approximately one-half of the pine stands harvested are not being adequately regenerated with pine."1/ An analysis of timber survey inventories (completed approximately every 10 years by the Forest Service) shows, in 13 southeastern States, that a net loss of 7,263,000 acres has occurred in the pine types. Nearly 6,600,000 acres of this land reverted to hardwoods.

As measured against existing opportunities on National Forests, reforestation opportunities on farm and miscellaneous private lands appear more cost-effective--in terms of potential growth increases. Figure 1 compares potential increases in softwood sawtimber growth, at different levels of expenditure (FY 1974 costs) for programs of cost-sharing tree-planting on farm and miscellaneous private lands versus treatment of National Forest areas. The curves assume in both cases treatment of opportunities in order of cost-effectiveness, i.e., the most productive lands first. The implied superiority of nonindustrial private opportunities is due primarily to large acreages in southern pine types, with high potential growth rates and relatively low treatment costs. Also, costs for National Forests include large expenses for general administration and planning which were assumed to not exist for nonindustrial private owners.

1/ South's Pine Reforestation Task Force Report, p. 2, July 1977. Williston, Ham. Editor. U.S. Dep. of Agric., For. Serv., SA.

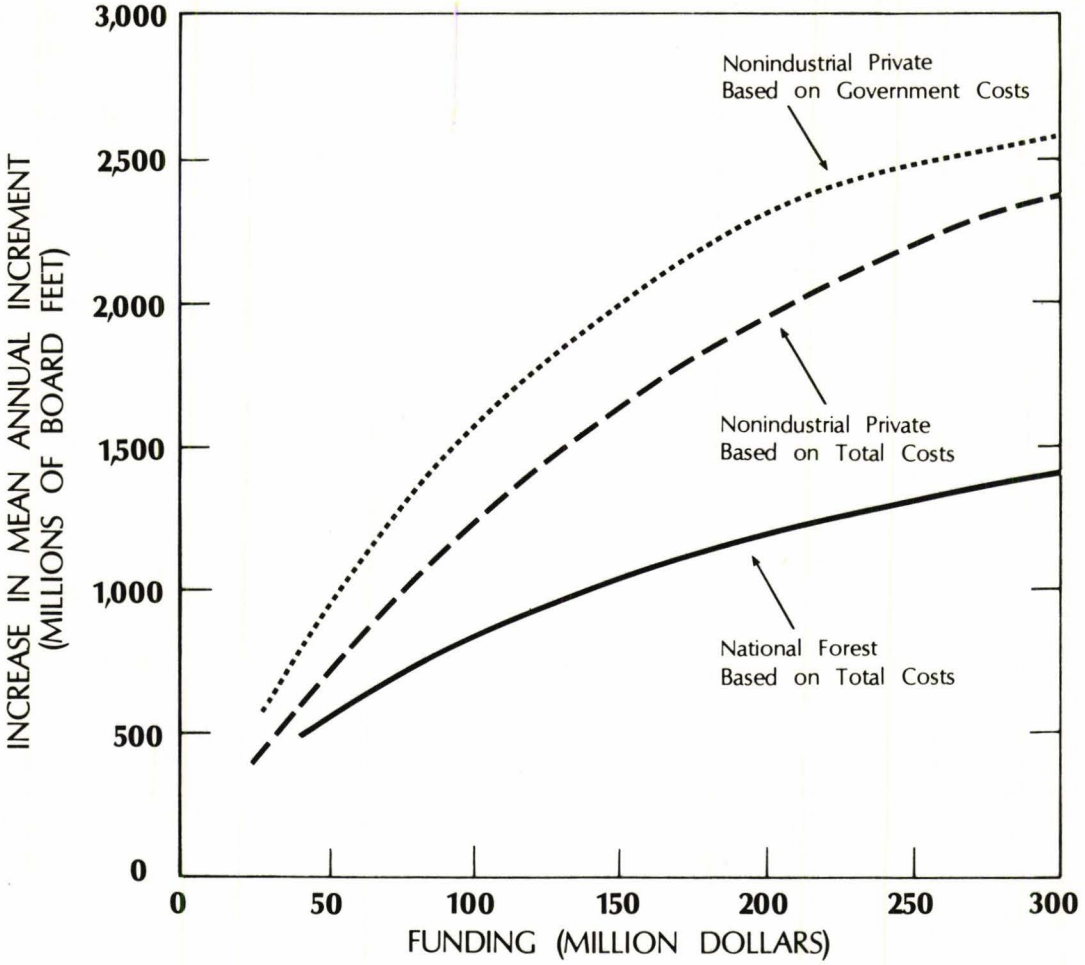

Figure 1. Comparison of softwood sawtimber growth maximization through nonindustrial private reforestation versus National Forest reforestation and stand improvement.

1/ Government cost includes 75 percent of direct treatment cost, plus technical assistance and followup inspection.

Source: Thomas H. Ellis. 1976. Cost-effectiveness of Federal program opportunities for relieving softwood timber supply problems. Unpublished Ph.D. dissertation, Michigan State University.

Wildlife and fish

Because of a continuing growth in our population, demands for essentially all wildlife and fish resources are expected to increase in the future. Unfortunately, it is very unlikely that the resources will be adequate to meet those demands, given present trends in land and water management. The consequences of such an imbalance will mean a general loss of opportunities for our population to learn to appreciate the roles of these resources in the natural world.

No one has been able to quantify satisfactorily the growing importance of these resources to Americans, but we have some partial indicators, such as:

--rapid growth in memberships and budgets in a variety of environmental and wildlife and fish organizations,

--increasing annual expenditures approaching six billion dollars by hunters, fishermen, birdwatchers, and other wildlife recreationists, and

--the Endangered Species Act expressing a national concern for the conservation of each individual species of wildlife and fish in each part of the Nation.

Given that the preservation and enhancement of these resources is desirable, the question is one of determining and acting upon the most cost-effective opportunities. With a relatively few exceptions where direct wildlife population manipulation is necessary, the key is preserving quality habitat. Although forested lands cover only one-third of the United States, they provide habitats that are critical to about two-thirds of all species of birds and mammals, and the management of these lands at least indirectly influences a substantial proportion of the remainder.

From the national perspective, critical habitats can be characterized as those essential to threatened or endangered species and those essential to migratory species for which treaties exist with other Nations (primarily waterfowl and anadromous fish). In addition, because our legal framework has given direct population control of most nonmigratory species to the individual States, a system of financially supporting State efforts through direct dollar grants is administered by the Fish and Wildlife Service. This system implicitly recognizes that, because wildlife and fish resources are generally consumed or utilized where they are produced, improvements in "national supply" really are sums of improvements in many local situations.

Habitat improvements on commercial forest lands have frequently resulted from timber harvesting, especially in hardwood forests. The joint production of timber and wildlife has generally been adopted because of an absolute scarcity of wildlife-directed dollars and because such joint production is generally most cost-efficient.

Private nonindustrial lands offer major opportunities for gains in wildlife habitat management. Numerous surveys suggest that most private nonindustrial owners are very much interested in wildlife conservation, but probably know little about management techniques used to foster wildlife. It is estimated that about 60 percent of all hunting-days in the Nation are spent on private woodland, largely because these lands are closest to the major population centers.

A second major opportunity is due to the extensive timber harvesting already occurring on these lands. For those owners requiring financial incentives or assistance, available funds appropriate for wildlife purposes would appear to lead to the greatest gains in habitat improvement when spent in conjunction with timber production.

Industrial lands, by definition, are dominant-use lands: Commodity production is the reason for their existence. Incentive payments or tax deductions that help cover necessary additional direct and indirect costs probably would increase activities that are beneficial for wildlife. The necessary technical expertise to carry out desired programs is generally available to industrial owners.

Public lands, and particularly Federal lands, are already managed in varying degrees for many wildlife and fish purposes.

Water resources

Recent projections suggest there are many parts of the country where water quantity and/or water quality will not be sufficient in the future to support a wide variety of economic activities; irrigation waters for agricultural purposes will become particularly critical.

While there is no single national water policy, several pieces of legislation have been enacted in recent years that express the national concern for adequate supplies of quality water. The policy and direction found in the following acts directly affect forested lands:

1. Watershed Protection and Flood Prevention Acts--to prevent damage from erosion, floodwaters, and sediment,

2. Water Resources Planning Act--to encourage conservation, development, and utilization of water and related land resources through coordinated actions,

3. Federal Water Pollution Control Act--to eliminate entry of pollutants into waters and to ensure water quality favorable to fish, shellfish, wildlife, and recreational use of waters.

On forested lands, it is Federal policy to protect watershed values, to reduce the danger of floodwaters, and to ensure high-quality waters. Given these concerns and given that a large portion of total water supplies will come from the one-third of the land base that is forested, the question is one of how the management of private forest lands can best contribute to the Nation's need for water quality and quantity.

Private forest lands are concentrated in the East, where water supplies are generally adequate. Here, the primary concern is protecting general watershed values and water quality by reducing erosion and sedimentation closely associated with timber harvesting, overgrazing, and land development. In certain situations, particularly on steep slopes, forest land is not able to regenerate, and the forest no longer can serve in its water-regulating function. Proper timber harvesting results in protecting forest resources. Flood prevention is an important ancillary concern in a relatively few locations. In the West, certain strategically located forested private lands in mountain country play an extremely significant role. Application of techniques to control the volume and timing of runoff is critical, both in flood prevention and in providing water for agricultural and fishery purposes when it is most needed.

Outdoor recreation

There will be increases in demands for a wide variety of forest-dependent recreation opportunities. Most of these demands will be for opportunities close to the major population centers.

The national objectives in outdoor recreation are outlined in P.L. 88-29, which states: "that the Congress finds and declares it to be desirable that all American people of present and future generations be assured adequate outdoor recreation resources." To implement this policy, a variety of efforts in providing technical and financial assistance to landowners and local units of government have been undertaken by the Federal Government.

It is probable that at least half of all outdoor recreation opportunities are provided directly by the private sector, including commercial enterprises and nonprofit organizations. Privately owned forested lands provide numerous opportunities for activities such as camping, hiking, hunting, birdwatching, etc. The distribution of these ownerships determines their relative contributions to the total opportunities made available to the public.

The major problems encountered in providing recreation opportunities on private lands include owners' liability for injury, trespassing in areas closed to the public, vandalism, littering, and lack of available capital or credit to upgrade or provide basic visitor facilities. Other problems include the difficulties of developing managerial expertise in the smaller, part-time operations while meeting legal, safety, and sanitation requirements.

Many private landowners use their lands for personal recreation, but generally do not view their land for its potential commercial or recreational values to others. However, private forest lands provide many free outdoor recreation experiences to many non-landowners. There is a significant private recreation business, generally oriented to more developed forms of recreation, such as private campgrounds. Where there are few alternatives on public lands, private landowners having the necessary business skills are in the best position to capture the values of providing recreational opportunities. Although significant in terms of income to owners, rather small acreages of forests are involved. Much larger areas are involved in second home or recreational home developments in which the purchaser becomes a forest landowner, but usually owns a small acreage.

Private lands used for dispersed recreation encounter less conflict with the production of other goods and services than private lands developed specifically for recreation use, (those either subdivided into relatively small lots or operated as money-making businesses for concentrated recreation). Owners of recreational lots may need

assistance with the special kinds of problems unique to these recreational developments. Timber production is often not an objective on these lands, but many other forest values are; however, trees will continue to grow on most of these properties and frequently will make their way into the timber supply.

Users of public and private recreational areas may, out of ignorance or by intent, misuse the areas, or fail to use them to best advantage. User education offers a major opportunity.

Forested range

Recent projections suggest that the demand for red meat is likely to grow more rapidly than the ability to produce it if range resources continue to be managed as they have been in the recent past. Demand in excess of supply would tend to channel more fossil fuels and more feed grains into meat production and lead to higher than average increases in consumer prices. Some portion of the foreseeable growth in demand for meat could be met by modifying the manner in which we utilize our rangeland and forested range resources.

The biological potential of these lands suggests that total meat production could be more than doubled. A more realistic estimate, however, is that total production of AUM's (animal unit months) of forage could be increased economically by about 60 percent. At that point, costs of production would probably approximate the value of the increased forage production.

Achieving this substantial increase in forage production on private ranges, including forested range, in an economically viable manner would require expanding the grazed acreages and increasing production through improved management of existing grazing areas. It is estimated that there are 425 million acres of private rangeland plus an additional 103 million acres of non-Federal forested range in the United States.

The high initial development costs and the opportunity costs associated with foregoing timber production suggest economically desirable opportunities for increasing grazing are probably minimal on at least the smaller forested ownerships. The most cost-effective opportunities for increasing range use on private forested lands in the South may be on larger (500 acres or more) ownerships where a rotation system of grazing can be practiced in conjunction with the production of timber, wildlife, and watershed values.

Expanded education and technical assistance are probably the first needs and might best be supplied through a coordinated Federal effort with implementation primarily through State and local agencies. Providing information to the private landowners is essential so that they

can make sound management decisions on integrating their forested rangeland into the overall ranching operation. A side benefit of utilizing forested lands for grazing in the most advantageous manner would be the reduction in resource-destroying exploitative grazing on other lands. Numerous opportunities exist to develop integrated range-timber-wildlife management programs that pose no threat to soil or water quality.

Because some range resources respond slowly to improvements, landowners who depend upon borrowed capital for financing may require flexible repayment arrangements geared to slowly increasing and variable returns, that is, repayments may have to be stretched over long periods and/or forgiven in the event of unexpected contingencies.

Finally, incentive or cost-sharing arrangements might be used to accelerate the rate at which forested ranges are improved. Sharing costs of range development between the Federal Government and individual permittees has long been used as a means of achieving proper resource use on Federal lands.

Total forest resource

If present trends continue, the national supplies of forest commodity products and services--of timber, fish and furs, water for irrigation, recreation, and livestock--can all be expected to decline relative to future domestic demands. A similar outlook holds for the amenity outputs of forested lands, such as opportunities for dispersed recreation and the simple enjoyment of natural settings and wildlife. To the extent that this happens, each of us will have lost some part of our cultural heritage; some of us will lose a portion of our material well-being.

Through a complex of laws, policies, and programs, Federal Government participates with State and local institutions in stimulating the production of each of the products and services on private forest lands. In each instance, those lands already contribute a large share of the Nation's total resource values and have the potential for making still greater contributions.

General Role of the Federal Government

Rationales

There are three general rationales that most commonly are cited to justify Federal actions intended to motivate and assist private forest landowners.

1. To correct imperfections in the marketplace.--If commodity markets are such that they lead to misallocations of resources, private landowners are unable to invest their resources where they could bring the greatest returns. The general causes of imperfections most often addressed in the past have been:

a. Inadequate knowledge of the private landowner. To alleviate this problem, efforts have been made to disseminate basic information so the owner knows his general options, to support the public reporting of pricing and other marketing information, and to provide direct technical assistance so that the most current and efficient methodologies can be applied on the ground.

b. Inability of the landowner to borrow capital. At times, landowners have real investment opportunities offering high rates of return at generally acceptable levels of risk but are unable to meet the conventional standards required of borrowers. The relatively long payback period to be expected of timber investments, when coupled with relatively short planning horizons of most nonindustrial owners, dampens enthusiasm to invest. Specialized loan programs, financial incentives, and other devices have been attempted with Federal participation.

2. To ensure adequate supplies of "public goods."--Individual private owners manage their holdings to maximize net benefit to themselves. Benefits from forest resource management frequently are "public goods" which have a cost of production (or protection) but offer little or no monetary return to the landowner. For example, habitat improvement for migratory birds, erosion control to reduce downstream sedimentation, and protection from fires, insects, and diseases may offer important returns to the public, but an individual landowner cannot collect payment from the beneficiaries. As a consequence, where such benefits are defined to be in the national interest, the Federal Government has played an essential role.

In some instances, commodities have been treated as "public goods." For example, where the market price for timber has been too low to induce the private production of timber, Federal incentives have been used to encourage investment by landowners so that the Nation's supply of timber would be increased.

The cooperative Federal-State assistance programs focused on improving the utilization of timber speak to a similar issue: meeting more of the Nation's wood needs from whatever timber supply is available. These programs are intended both to facilitate the marketing of timber that would otherwise not be harvested and to minimize the waste of wood during harvesting and processing. It is estimated that, in FY 1976 alone, such activities contributed to the Nation's timber supply the equivalent of the 40-year growth potential of 50,000 acres of high-site southern forest lands. Such cooperative programs can be the determining influence on whether or not timber management activities will occur on the smaller, private ownerships.

3. To ensure quality in the environment.--Over time, an increasing number of Federal programs have been brought to bear on improving the quality of life--to make America a safe and satisfying place to live and work and play. In general, this concern is the rationale for specific Federal activities on private lands that are addressed to noncommodity resources, such as wildlife habitat. This concern also sets constraints on the manner in which Federal funds are applied to the ground by ensuring that those funds will not harm, or will directly enhance, environmental values. For example, technical assistance to ensure the proper location and construction of logging roads is a current effort.

Administering Federal programs

There has been a growing trend for a wide variety of Federal programs to be administered through, and conducted by, State and local agencies. The four general approaches have been:

1. To provide "seed monies" to the States.--The intent is to start with substantial Federal participation and to gradually reduce funding as the States develop the ability to take over the effort. One outstanding example of this in forestry has been the cooperative fire control programs; Federal contributions as a proportion of total expenditures have been shrinking steadily over time.

2. To share the cost of State activities required by Federal law.--Numerous Federal laws have required State expenditures, as in the case of the Federal Water Pollution Control Act. Planning grants have been provided and cost-share arrangements have been proposed to compensate the States for costs of implementation.

3. To provide Federal assistance through revenue sharing.--In the last decade, the concept of revenue sharing has been accomplished by a desire to provide States with more effective control of monies spent locally. The idea of comprehensive, statewide forestry plans (and earlier efforts to strength State and local institutions) has as it central thesis that the individual States should have such control.

4. To provide direct Federal technical and financial assistance.--This assistance has been provided to State and local units of government and to private owners for many purposes. Specific efforts are discussed later in this report.

PROBLEM AREAS IN DEVELOPING FOREST RESOURCES ON PRIVATE LANDS AND POSSIBLE APPROACHES TO SOLUTIONS

Historically, supplies of all the major outputs from U.S. forests have been adequate to meet demand at comparatively low cost to consumers--with relatively little direct investment in forest management. Even in the case of softwood timber, stumpage prices have risen significantly only in recent years. Thus, the primary problem inhibiting landowner investment has been insufficient market demand and too low market prices. This problem has often been compounded by a lack of information when potentially good investment opportunities have indeed existed.

Situations were identified where the total benefits to society from the conservation and management of forest lands may be considerably larger than those accruing to the landowner. Thus, it may be in the public interest to encourage particular forest management investments on private nonindustrial lands. In cases where private profits are insufficient to induce socially desirable investments, government action to improve the landowner's benefits relative to costs may be necessary.

Approaches developed in this section that might be taken to encourage and assist in the conservation and management of nonindustrial forest resources include:

- provide education to improve the awareness by landowners and by the general public of the potentials of forested lands,
- supply technical education and services,
- increase landowner knowledge of forest investment opportunities and access to capital,
- reduce physical and financial risks and uncertainty,
- encourage aggregations of landowners and support other methods to gain economies of scale in forest management,
- develop favorable tax policies and teach landowners how to benefit from them,
- increase landowner access to necessary labor and equipment,
- provide direct financial assistance to landowners, and

- provide financial and technical assistance to State and local institutions.

This listing was initially developed from the seven categories of problems identified by the Trees for People Task Force, American Forestry Association, in a 1973 report. Such a categorization provides a convenient framework for discussing the major factors inhibiting landowner activities in forest conservation and management.

Education of Landowners and the Public at Large

Problem

Too few nonindustrial forest owners have enough knowledge of the ways in which they might use their lands to take full advantage of opportunities that would be in their own best interest. To make the wisest possible resource decisions, landowners must better understand their roles as managers and stewards of forest resources and the implications of their decisions, and they must possess the knowledge and skills to undertake management activities.

The general public also lacks information and understanding about the contributions forest resources can make to the Nation.

Discussion

The current system of transferring both new and standard forestry technology to forest owners is poorly defined. It is likely the typical forest owner does not know how to obtain that information that would be necessary to improve the management of his lands.

The landowner situation has been succinctly described by Lester Holley of North Carolina State University: 2/

> "Without doubt, some basic knowledge, understanding, and education is a critical constraint which must be overcome before widespread progress can be made toward the development of private forest resources. The logic for a better delivery system of general education is based on the view that the landowner is the decisionmaker on his woodland acres. Whenever woodlands are neglected, we have tended to assume that the landowner has made some decision, based on personal motivation and a body of surrounding facts, not to develop his land. Yet, how many facts about the situation does the landowner really have, and how much does the typical landowner really know about forestry and the costs and multiple benefits to be derived from managing his land?"

2/ Paper presented at the Society of American Foresters, Appalachian Section Meeting, February 5, 1976, Asheville, North Carolina.

A second major need is to improve the general public's understanding and appreciation of multiple-use resource management and the relationship between forest resources and environmental values. Forest resource education is needed to explain the compatability of different uses and the rationales for, and possibilities of, enhancing several resources simultaneously. For example, timber harvesting can be done in a way that will simultaneously improve wildlife habitat and timber growth. Public understanding of multiple-use management leads to an atmosphere conducive to the development of the total potential of private forest lands. Some of the audiences requiring specific educational efforts are absentee forest owners, forest resource professionals, vendors, timber harvesters, wood processors, conservation groups, and consumers of forest products.

Within the Department of Agriculture, the Extension Service, the Forest Service, and the Soil Conservation Service are particularly involved in educating the general public in forest land management. Other USDA agencies, Federal Agencies outside USDA, State agencies, and other institutions provide information pertinent to forest management. However, existing efforts are not adequate to ensure improved decisions on the ground or greater landowner involvement in decisions of public policy that will affect them.

Approaches

To improve the Nation's timber supply and to ensure the adequate consideration of all forest resources, expanded educational efforts could be developed to:

1. Provide problem-oriented education to help landowners and others

   -- improve the productivity of forests and the efficiency and safety of logging and wood-processing operations, giving preference to audiences with inadequate expertise such as woodland owners, small loggers, and operators of small forest and related enterprises,

   -- to protect and enhance the basic resources of air, soil, and water, and

   -- to enhance the esthetic and recreational benefits of trees in both urban and forest settings;

2. Better transfer new information to potential users, while emphasizing the impact that the application of new technology may have on forest productivity and community and environmental quality; and

3. Provide useful and credible resource-use information to the public, thus improving public decisionmaking and increasing the benefits the public obtains from forested lands.

Technical Knowledge and Assistance

Problem

Forest management is a highly technical, long-term proposition with important management activities occurring at wide intervals. Many small landowners need help to develop and maintain a high level of technical skills or the detailed market information necessary to most effectively carry out activities, such as wildlife habitat improvement or timber sales.

Absence of technical knowledge increases uncertainty and greatly limits the participation of the landowner, even in actions which might be highly profitable to him. Because he is interested in particular management activities only occasionally, a general education program to inform him of basic opportunities and current sources of help would be advantageous. Then a direct technical assistance program could respond to the landowner's specific needs. Finally, research could identify gaps in existing information or develop new information to help raise potential management benefits in comparison to costs.

Discussion

Educational efforts to help increase production from the small, private forests are essential to meet future demands. Frequently, these forest lands are accessible to markets and have a relatively high production potential.

Forest resources management today often includes production of timber products, water--both quantity and quality--wildlife habitat, recreation, and esthetic values.

The development and implementation of new management technology is of interest to all Federal and State agencies working with private lands. Professionals play a key role in transferring technology to landowners. To be effective, professionals must have adequate opportunity and incentive to update their knowledge periodically. Increasingly, they must acquire knowledge in areas other than their specialties so they can look at problems in an interdisciplinary perspective. Continuing education helps shorten the time lag between research and application.

Foresters working with nonindustrial landowners need to provide the best information available, and researchers and educators need to understand the problems encountered on the ground. The end result of better communication between these professionals will be that research will be more useful to those in the field because it realistically addresses current problems.

Direct assistance from public agencies is available to forest landowners in three forms which are complementary to each other. In combination, these efforts provide a framework for an accelerated and comprehensive approach to assistance:

-- The landowner may be given direct assistance in land-use planning and treatment for his entire unit, including nonforest as well as forest lands. Fundamental to such planning is the use of soil surveys and other basic information currently developed by USDA agencies.

-- The landowner may receive direct technical assistance in forest management and assistance in marketing from State and local institutions (in addition to assistance from the private sector). This assistance is available as part of a Federal-State cooperative effort.

-- Cost-sharing assistance is available through two Federal programs and in a few States through State-sponsored programs. Implementation of planned forestry practices may be made possible through these programs.

A Department of Agriculture study of technical assistance in 1970 indicated that the regular availability of marketing information--such as (1) stumpage and log prices, (2) log scales, grades, and measurement procedures, (3) rates of return from forestry investments, and (4) the relative financial desirability of alternative forestry prices--had a direct bearing on the acceptance of forest management by landowners. The availability and use of stumpage prices and other marketing information probably would result in higher stumpage prices received by the forest landowner. It is not known empirically whether this additional income would be reinvested in forest land in the form of tree planting or timber stand improvement activities, but casual observations suggest that general increases in stumpage receipts (those not related to a price reporting procedure) are seldom reinvested.

Most forest management research is conducted by the Department of Agriculture and universities. Some of the largest forest products firms also conduct research on a broad array of forest resource problems. There are institutional barriers which impede program effectiveness. Many people believe that much new knowledge generated by researchers each year goes unused for long periods because of inadequate technology transfer systems. On the other hand, some researchers themselves have found that practical research solutions to current forest and forest products utilization problems are in great demand and are adopted by users even before the research is published.

Feedback from practitioners as a basis for modification of ongoing research projects or proposed projects is critical if the final results are to solve forest management problems. On a national, regional, and

State basis, the researchers, field specialists, and educators need to work together in both research formulation and application.

A constantly growing audience of absentee woodland owners for research results has emerged in the last 20 years. These owners frequently are interested in noncommodity values of forest lands. Generally, this is the area of which the knowledge base is weakest.

Approaches

1. Broad educational approaches:

Educational programs in range, water, recreation, and wildlife management and in general environmental values acquaint forest landowners and the public with the interrelationships which exist among the many uses of forest land. These "nonwood production" uses of forest land can be enhanced with the application of forest management practices. Educational programs can stress the compatibility between trees, forests, and forest lands for range, water, esthetic, wildlife, fisheries use, and recreation.

Private landowners need to know the potential productivity and use of their forested lands, the opportunities for specific management investments in timber production, the value and markets for timber products, and ways to manage for the simultaneous production of timber and other forest values. A forest management educational effort could inform private landowners of improved practices which could be undertaken on their own lands. Such efforts could stimulate additional timber production while satisfying other land-use objectives of the owner. Owners would be informed of Federal, State, and private forestry assistance programs. Where appropriate, use of the services of a specialist would be encouraged.

Absentee landowners pose a special problem because they do not live on their land. Collectively, they own large acreages of forest land and are often willing to undertake forest management when informed about the potentials in a way which meets their objectives for owning the land.

Wood processors, timber harvesters, and large owners of forest land are special audiences for educational efforts. Educational programs can teach new harvesting and production technologies, ways to reduce losses in lumber drying and storage, and methods for extending resources through more efficient and less wasteful processing techniques. The net result would be the production of more end-products from a given supply of raw materials.

Technical obsolescence can be overcome by the continuing interdisciplinary education of professionals. Life-long continuing education should be urged for all natural resource professionals to help them better serve the public.

2. Technical assistance approaches:

a. Public technical assistance activities are limited in some areas because of inadequate manpower. The result is that too few landowners ever receive the technical help they need and less is done on the ground than would be advantageous. In some situations, expansions in the numbers of service foresters is the major current need.

Recent Federal legislation (Section 208 of P.L. 92-500) requires developing regulations to minimize nonpoint-source water pollution arising from silvicultural activities. Conservation districts, State forestry agencies, and other concerned institutions and organizations will be heavily involved in helping to develop the requirements and ensuring the law's objectives are met. The public technical assistance effort will be affected in two ways: (1) More technical assistance will be required and (2) more complete knowledge and expertise will be required on the part of those giving assistance.

A system of timber price reporting with pertinent marketing information could be initiated under Federal or State auspices. Information would be gathered on a regular, periodic basis and supplied directly to the landowner, perhaps as part of a broader-based newsletter containing forestry topics or complete in itself. Several variations of price reporting exist now among the States. It is possible that a coordinated effort among forest management agencies could result in a more uniform format useful to more landowners.

A major current activity is providing research information and technical assistance to timber harvesters, wood processors, and forest industries to help them produce more logs from stumpage and more end-products from the logs. The technical assistance effort over the past 5 years is estimated to have increased the end product yield from a given stumpage volume by about 18 percent.

There are three general ways in which almost any assistance effort could be made more efficient (in fact, most Government programs could be improved):

(1) A priority of service concept could replace the traditional first-come, first-served basis of providing public services. Assistance could be prioritized on the basis of owner receptivity to assistance, the productivity of forest lands, and/or the sensitivity of lands to environmental degradation. Such a change would require some States to remove legal obstacles.

(2) An improved delivery system of public technical assistance efforts would increase efficiency of the administrative machinery for program delivery. An example would be to replace the service to a single

landowner with a system of landowner aggregation where assistance is provided to a group.

(3) A more unified and consistent Federal approach would tie all assistance efforts together, so that the efforts would be carried out more effectively. An example is agricultural programs directed to farmers who also happen to own forest lands. Coordinating mechanisms are needed.

b. Technical assistance by consulting foresters could be expanded to complement public programs. Such services could be promoted wherever the capability to sustain a business can be developed. It is likely that an increasing share of the technical assistance effort--and certainly that involving extended assistance--will fall upon the consulting forester. Recent estimates indicate approximately 1,500 consulting foresters are practicing in the United States today. At least 2,500 may be needed to adequately service the target clientele for such services. A key requirement is a close relationship between the public and private programs. To ensure effectiveness of program benefits, roles of both sectors must be defined and understood; this must be done on a State or sub-State basis. Initial contact and reconnaissance and management plan preparation by the public forester and timber harvest and forest management practice implementation by the consulting forester is one approach. To assure close coordination of the two sections and to protect the landowner, a "certified-forestry-agent" approach has been suggested. This would permit the State forestry agency to certify private consultants who provide assistance.

Many technical assistance cases offer only limited profit opportunities, effectively discouraging the consulting forester from undertaking them. To expand the corps of consulting foresters will require Federal/State support, at least initially, of their efforts. Several approaches involving subsidization have been tried.

c. Assistance provided by forest industry foresters as a part of their raw material procurement program is the third area of technical assistance to landowners. Many of the major forest industries have begun assistance programs in recent years to stimulate timber production on private lands. The programs, which include technical advice and often intensive forest management services, are usually available to landowners within the individual plant or mill's area of procurement. The tying together of the technical assistance and the services necessary to carry out the assistance recommendations (usually provided to the owner at the company's costs) is a valuable feature of these programs.

These programs have a direct relationship to the public programs. Where opportunities exist, public foresters could provide appropriate

information to the owner on the availability of this industry program. Expansion of public and consulting forester programs clearly indicates the need for encouraging the forest industry to keep its technical assistance efforts growing at an equal pace.

3. Research approaches:

The discussions of problem areas and approaches suggest types of information that are needed; research activities develop the basic knowledge that leads to such information. Examples of major research needs with important implications for the problems and approaches include: (1) Landowner characteristics associated with receptivity to Federal programs and output responsiveness; (2) program delivery systems, including market information and technical forestry practices; (3) forest business practices and financial planning needs of private landowners; (4) manpower training needs; (5) "incentives" programs such as cost-sharing, taxation, etc.; (6) ways and means to overcome the relative diseconomies of small-scale nonindustrial ownerships; (7) the development of low-cost and simple management systems suitable for small ownerships; and (8) acceleration of research on biological control of forest pests and the environmental implications of accelerated forestry programs on private nonindustrial forest lands.

Two steps are necessary to ensure that research knowledge is effectively developed. They are: (1) To establish research priorities based on consideration of the unique problems of all cliental groups including the private nonindustrial forest lands, and (2) to insure that research is one part of an integrated system defining needs, conducting research, applying research, and modifying conclusions on the basis of operational applications. To accomplish these two steps, regional and national planning groups have been established to identify needs and to delegate responsibility for application to specific individuals. In both of these efforts, there is explicit cooperation between the State universities and the Federal Agencies. Strengthening these efforts will improve the awareness of problems, the responses to these problems, and the delivery of this knowledge.

Availability of Capital

Problem

There are three capital-related problems facing the private nonindustrial forest landowner: (1) Cost of private capital is often too high relative to expected returns; (2) uncertainties as to forest production costs, returns, and risks discourage capital investment; and (3) returns are periodic, thus creating cash flow difficulties in meeting annual operating expenses. The cash flow problem affects current landowners, while the cost of capital can be a deterrent to present as well as prospective forest landowners. These problems have been frequently discussed in the context of timber production but they are important whenever a landowner wants to invest in his land for any purpose.

It is estimated that 15 to 20 percent of all nonindustrial private forest lands require tree planting if they are to be fully productive; 46 percent need cultural treatments; and perhaps 10 percent need better protection from grazing. 3/ Timber production on these lands can be increased substantially, but extensive capital investments would be required.

Discussion

Availability of capital in the private money market depends on the prospects of making money and security. 4/ Professional lenders and investors seek the highest net returns with minimum risks. Investment in private forest land often offers neither prospect (relative to alternative investment opportunities). The pretax yield on capital invested in forest land management averages 2.5 to 3.5 percent nationwide, while current long-term market rates of interest approach 10 to 15 percent. 5/ (However, there is great variation in investment returns on different forested sites even within a region, and there are many areas where the returns are much greater than the nationwide average.) In addition, the lack of insurance programs offering protection from fire, insect and disease losses increases risks, especially on the small ownerships.

3/ Pomeroy, K. and J. Muench. The challenge of private woodlands. 1973. American Forestry Association.

4/ Capital shortage: its causes and cases. 1976. The Conference Board. New York, NY.

5/ Pomeroy, K. and J. Muench. op.cit.

If capital were available in unlimited supply, forest owners would still have to demonstrate that they could meet repayment schedules at market rates of interest. Three difficulties immediately arise: Many forest investments do not yield sufficient monetary returns; returns are usually periodic and long delayed thus creating cash flow problems for the owner; and returns may be so far in the future the owner simply isn't interested.

Owners face a variety of risks and uncertainties. These arise from the physical risks inherent in long production periods; from difficulties in making projections of yields; and, frequently, from a lack of sophistication in finding the best markets for their products. Regardless of the source, any uncertainty tends to discourage investments for owners with limited resources.

Frequently, the landowner must receive some sort of subsidy--such as direct payment or a low-cost loan or a tax advantage--before he is able or willing to make investments in conservation or management of his lands.

Approaches

1. Current approaches:

a. Cost-sharing.--The cost-sharing programs are aimed at alleviating the cash flow and capital cost problems of the landowner. However, they do little to reduce the problems related to uncertainty in forest investment.

(1) Forestry Incentive Program (FIP).--Initiated in 1974, FIP provides cost-sharing of up to 75 percent of forest establishment costs. An advantage over the Agricultural Conservation Program (ACP) is its provision for use of cost-effective measures to guide allocation of funds.[6/] A few States have introduced similar programs without Federal participation.

Several changes could be made to improve the effectiveness of FIP.[7/] FIP could be combined with a comprehensive planning approach to result in a total unit plan. Funding levels could be raised and practices expanded to make greater use of improved stock and, in selected locations, of fertilizers. By pooling the work that could be done on adjacent ownerships, the diseconomies of scale encountered on small ownerships might be partially overcome. Elimination of the "prior harvest" rule--that

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6/ Mills, T.J. and D. Cain. 1974 forestry incentive program: indicators of cost-effectiveness. J. For., October 1976.

7/ Hoekstra, P.E., J.K. Myers, and D.L. Green. A program for increasing timber supplies on nonindustrial private forest lands. 1976. Unpub. Staff Paper, Cooperative Forestry Staff, Forest Service, U.S. Dept. of Agriculture.

is, the requirement that these monies cannot be used to replant recently harvested areas--in itself would be a substantial improvement. In addition, more favorable Federal income tax treatment of cost-sharing payments (i.e. writing off such payments as current costs) would further reduce the cash flow difficulties. Finally, better cost-effectiveness measures are needed at the local level to more effectively allocate FIP funds to the most rewarding opportunities.

(2) Agricultural Conservation Program (ACP).--Although similar in nature to the FIP, it is aimed primarily at farmers for conservation purposes, while the FIP has been designed to generate the largest increase in timber production at least cost.

(3) Industrial leasing of nonindustrial forest lands.--See the discussion in the section entitled Economies of Scale.

(4) Modification of tax treatment.--See the discussion in the section entitled Taxation.

(5) Forest protection programs.--By reducing the possibility of physical losses, the general attractiveness of investments in forest management would increase. See discussion in Risk and Uncertainty.

b. Credit-loans.--There are four major sources of credit available to the private landowner:

(1) Federal land banks.--Loans to 65 percent of the appraised value of the property are made at a maximum interest rate of 8 percent for a period not to exceed 40 years.

(2) National banks (members of Federal Reserve System).--This is a more restrictive credit source in that mortgages cannot exceed 15 years and the interest rate is more competitive with the existing money market. (State banks are governed by individual State banking laws.)

(3) Insurance companies.--These are the only major sources of truly private long-term lending on timber and timberlands.8/ The major "problem" in terms of forest resources production is that, because interest rates are competitive, most capital is channeled to alternative investment opportunities that are economically superior to investments in forest management.

8/ Siegel, W.C. Timber loans by U.S. life insurance companies. 1972. SO-73, USFS.

While these sources make money available to the landowner, the cost of the money is often too high to permit investments in forest resources. Both land banks and insurance companies provide for landowner cash-flow problem by tailoring repayment schedules to timber harvests--such as paying only interest until a harvest is made and then making a large payment on principal. Sometimes payments can be delayed for 5 to 10 years. Both of these kinds of institutions, in fact, force the borrowing landowner to practice good forestry. His stand must be well-managed under an approved management plan in order to obtain and keep the loan--whether or not the loan proceeds are used for forestry purposes.

(4) Farmers Home Administration loans for forestry purposes.--These are available to farmers unable to obtain reasonable credit elsewhere. Three types of loans are provided: (1) Farm Ownership Loans for developing or buying forest land or refinancing debts against forest land; (2) Soil and Water Loans for developing or improving forest resources; and (3) Operating Loans for normal costs of producing, harvesting, and processing forest products.

c. Credit education programs.--Education programs can be designed to tell potential lenders and borrowers about the possible role of credit in financing forest management activities. Techniques to assess the potential economic returns from forest investments would improve lenders understanding of investment opportunities; the availability of credit and the procedures for obtaining loans would help borrowers. (See the discussion under Technical Knowledge and Assistance.)

2. Other approaches:

a. Lump-sum loans.--These would be simply loans made at below market rates, subsidized by Federal funds.

b. Low interest, deferred payment loans.--Loans are repaid out of timber sale receipts (non-recourse loan).

c. Forgiveness loans.--Loans that waive a portion of the loan and interest contingent upon forest management and improved harvesting over the loan period. This would require Federal legislation similar in intent to laws adopted by some States (California for example) to promote land-use control.

d. Annual payment to landowner.--This approach would reduce the cash flow and cost of capital problems indirectly while reducing risk by assuring the owner of a market for his product.

e. Tree bank program.--This approach would address the cost of capital and cash flow problems. It would be similar to the low interest, deferred payment loan in that it would provide for cost-sharing to the owner for forestry practices and then provide an annual rental payment for 10 years following planting. One example of such an approach is the Soil Bank Program of the late 1950's. About 2.3 million acres of trees were planted. A recent survey discovered that, while some stands had been harvested for pulpwood, 83 percent of the plantations are still intact.

f. Interest subsidy for forest real estate mortgage debt.--This proposal is aimed primarily at reducing the high cost of capital problem. It would subsidize the interest payments to private lenders of private forest land mortgages. It would be used to finance initial forest investments, the holding of immature timber to rotation, and the purchase of land for forestry purposes. The landowner would pay service costs of the loan and annual interest of, perhaps, 3 percent on the principal; the difference between his interest payment and the payment due the lender would be subsidized.

g. Commodity price supports.--This approach would be the only one aimed solely at the investment risk problem. Industry would enter into cooperation with the owner by guaranteeing a minimum price for all products provided by the landowner. In turn, industry would get a guarantee of the right to offer a first denial for purchasing the timber.

Risk and Uncertainty

Problem

Forest owners encounter unpredictable risks in managing their timber. They may suffer losses from both natural and human causes. They also may suffer unexpected increases in taxes, sudden decreases in market values when they wish to sell, or the imposition of governmental restrictions upon the management of their land. They may have sudden needs for cash--necessitating forced sale of their assets--or may simply change their plans for using their lands.

Discussion

1. Natural causes of risk and uncertainty:

The risk of damage from fire, insect, disease, animals, flood, wind, ice, and sedimentation exist in one degree or another in all parts of the Nation. In some areas, the risk of damage is so great that certain forest management practices are not used at all.

a. Fire.--Fire prevention, protection, and suppression activities have been carried out in many parts of the United States, but nearly 256 million acres of forest and watershed lands lack any kind of organized protection. In the East, with 64 percent of the commercial forest land base in private ownership, of every million acres of non-Federal lands protected, about 2,000 acres burn each year. In the West, with 19 percent of the base in private ownership, 1,200 acres of every million acres protected burn each year.

Plantations are particularly susceptible to damage from fire for the first decade after establishment; it is estimated that the annual loss in the South is the equivalent of 850,000 acres each year. Protection measures for newly established stands are detailed in the South's Third Forest (see (18), p. B-7).

Destruction of trees and other vegetation often leads to other effects, such as increased erosion, increased sedimentation in streams and a consequent decrease in water quality.

b. Insects and diseases.--Over 2.7 billion cubic feet of timber is killed on the Nation's forest lands by insects and diseases each year. This includes nine billion board feet of sawtimber and is in addition to a similar volume of lost growth in sawtimber. The annual volume loss is about 40 percent of the annual harvest and exceeds $500 million in stumpage value.

Proper forest management and utilization techniques can reduce such losses. Epidemics are regional in nature and currently include the southern pine beetle in the South, the gypsy moth and spruce budworm in the Northeast, and the mountain pine beetle and spruce budworm in the West. Control efforts must be spread over large areas and necessarily include all types of lands, regardless of ownership. States, private landowners, and the Federal Government jointly participate in these efforts, with the States usually providing coordination for control on private lands.

Prevention, detection, and control are all difficult and complex tasks. At present, chemical control is the method most widely used, although it is expensive and usually produces only temporary benefits. For the most part, nonchemical controls are still in the testing stage; the goal of achieving integrated pest management has not yet been achieved.

c. Other natural causes.--Animal damage, such as that caused by browsing by big game, bark stripping by porcupines, and flooding caused by beaver dams is a problem in many local areas. Winds, floods, and ice storms all cause extensive local damage but the subsequent losses are difficult to forecast.

2. Other causes of risk and uncertainty:

a. Liability.--Private land areas, including forests, are suitable for public outdoor recreation. Yet, much of this land is not available to the general public for a variety of reasons, including possible damage to the land or other property and personal injury lawsuits. As a partial solution, many States have laws limiting the liability of landowners who supply outdoor recreation.

b. Arson and timber trespass.--Man-caused fires and timber trespass may be serious risks in some localities, especially for absentee owners. Arson fires account for the burning of about 560,000 acres each year. Timber theft may occur during wholly unauthorized harvesting, or even in the case of timber sales where the logger may cut additional trees not intended for sale. The cost of preventing such mishaps may be relatively large in comparison to losses. Irresponsible trespassers cause property damage and are a nuisance.

c. Lack of liquidity.--Because benefits from investment in stand improvement may not be realizable for a decade or more, unexpected personal crises sometimes lead to losses of such investments. In the case of plantations, except for Christmas trees, there is virtually no realizable product until stands are at least 12 to 15 years old. Thus, an owner would have little chance of cashing in his investment in young

plantations without selling his land. If marketable timber exists, a forced sale may be either good or bad for the landowner, depending upon the vagaries of the market place. The landowner also risks losing much or all of his investment in silvicultural treatments if he suddenly changes his land use; for example, from timber production to agriculture or to residential development. Such changes are common on nonindustrial ownerships.

d. Rising taxes.--Rising taxes are a chief concern of forest owners. Ad valorem taxes on forest lands have risen rapidly in many areas, especially on the periphery of urban areas and in areas of high recreational use. Some owners may be forced to sell their properties, or to liquidate their timber sooner than planned, because of unexpectedly high taxes. Timberland is owned for many reasons, but high taxes create a burden, especially when income from these lands is low or income from other sources is limited.

e. New legal restrictions.--Unanticipated legal restrictions on the manner in which private land is used can cause an investment to become uneconomic or can discourage potential investors. Condemnation proceedings for road development, powerline construction, or reservoir sites and restrictive zoning ordinances all have potentially adverse implications for forest land management.

Approaches

Protection from fire, insects, and diseases should be related to the values being protected. Increased fire prevention and rapid initial suppression activities offer the best means of reducing risk to the landowner. Long-range insect and disease controls can best be achieved through prevention activities such as the careful implementation of silvicultural prescriptions and complete utilization of timber crops. Control projects should be directed towards biological or other preventive techniques and away from reliance on non-specific chemical treatments.

Insurance against major losses is frequently suggested to provide financial protection for the owner. At this time, no American company offers forest fire insurance as a regular line. Past commercial attempts have all failed. The cost of coverage to the landowner may be too high and/or the risks too great to justify insuring his land. A few companies, however, occasionally provide coverage on an individual basis as an accommodation to customers, along with insurance on manufacturing plants or other properties.

Section 518 of the Federal Crop Insurance Act, as amended, includes timber and forests in the definition of "agricultural commodity." Therefore, no additional legislation is needed for the Federal Crop

Insurance Corporation (FCIC) to insure timber from fire or other risks. At the present time, the FCIC does not extend coverage to timber, apparently because there are no funds available to administer such a program.

Trespass and arson risks might be resolved through more positive action by local governments. Absentee owners could become more aware of the problem through an information and education program, and engage in closer observation of their land.

Futures and strategic materials stockpiling.--In order to lessen the problem of inadequate current and future markets for certain types of timber, to lessen the owner's waiting period for income, to encourage owners to hold timber to maturity and to effect a more even availability of standing timber to processors, research and pilot testing should be directed towards:

-- the possibility of establishing a commodity "future" type marketing structure for standing timber stumpage on private lands, and

-- the possibility of including stumpage or semi-finished forest products in the Federal Government's program of stockpiling strategic materials for defense purposes.

Education activities could heighten the awareness of landowners to risks so they would have a more realistic basis for making decisions about management activities.

Economies of Scale

Problem

Small owners suffer significant diseconomies of scale. Their small size puts them at a marked disadvantage in three respects (relative to the large industrial landowner)[9]: (1) They have much less market bargaining power; (2) technical and managerial services have high unit costs; and (3) resource investments are extremely costly relative to expected returns.

Seventy-three percent of the 296 million acres of nonindustrial private forest land is in ownerships of 500 acres or less (table 2).[10] The average ownership is about 70 acres. The diseconomies associated with these relatively small forest tracts are a major obstacle to the practice of forestry and the increase in wood supply.

Table 2.--Private nonindustrial forest ownerships by size class and number of owners

Size (acres)	Total Area (million acres)	Number of Owners (thousands)
Less than 100	120.5	3,377 (est.)
100 - 500	95.8	623
500 - 5000	43.0	
5000 - 50,000	20.3	
Larger than 50,000	16.3	
Total	295.9	4,000 (est.)

9/ Pomeroy, K. and J. Muench, op.cit.

10/ Hoekstra, P. E., J. K. Myers, and D. Green, op.cit.

Discussion

Some owners of small forest tracts may not make forestry investments because fixed or overhead costs required for supervision, management, travel, and equipment result in high unit costs for silvicultural practices. For example, Row[11/] and other investigators have found that the cost per acre for silvicultural treatments, such as site preparation and planting, precommercial thinning, and cull-tree removal on 10-acre tracts are roughly two to five times higher than on 160-acre tracts. Further, because of diseconomies in harvesting small tracts, sales by nonindustrial owners normally command lower stumpage prices than larger tracts of equal quality. The combination of relatively high timber management costs and low stumpage prices results in lower financial returns for the small woodland owners. This prospect discourages the owner from investing in the management of his forest land.

Approaches

To overcome the disadvantages of small tract size, landowners could combine their holdings in some manner to reduce the costs of management and marketing activities.

1. Current approaches:

a. Forest cooperatives and associations.[12/]-A means of lowering the fixed costs of managing small forest tracts is through the formation of forest cooperatives and associations. By consolidating planting, thinning, harvesting, and other management activities, small landowners can enjoy many of the economies normally found on larger scale forestry operations.

Most of the forest cooperatives established during the past 50 years have gone out of business. Many of the failures can be attributed to the lack of sufficient working capital and managerial talent. Even successful forest cooperatives have found it not economically feasible to manage and market forest products from ownerships of less than 300 acres. Since much of the private nonindustrial forest land is in smaller acreages, cooperatives appear to have limited application to the small landowner problem unless an aggregation of small-sized tracts into larger units can be brought about.

11/ Row, Clark. 1973. Probabilities of financial returns from southern pine timber growing. Ph.D. dissertation. Tulane University. 428 pp.; Row, Clark. 1974. Effect of tract size on financial returns in forestry In Proceeding, IUFRO, Div. 3, Forest harvesting mechanization and automation. Ottawa, Canada. pp. 105-137.

12/ Pomeroy, K. and J. Muench, op.cit.

b. Industrial leasing.--An alternative to public leasing and management is to encourage more leasing by forest industry. In the South, where industry leasing of forest land is a well-established practice, there are 6.7 million acres under long-term leases of 25 years or more. The management of leased lands ranges from very intensive to custodial care.

Usually it is the largest and most productive forest tracts which are leased. Small tracts may be taken under contract if they are strategically located or have a high volume of growing stock per acre. Because of the variation in agreements, there are no assurances that additional land brought under the lease will be managed in the most productive manner.

Leasing is attractive to industry primarily because it insures a steady supply of raw materials without tying up large amounts of capital in land purchases. Landowners enjoy regular income from their land and the retention of their property rights.

c. Targeting assistance to most cost-effective opportunities.--Cost-effectiveness of technical assistance and financial aid programs might be increased by concentrating efforts on the larger ownerships. While such concentration might be politically unpopular, it would probably result in considerably greater output per dollar invested. Another possibility is concentration within a particular area, for example, as was done on the Yazoo-Little Tallahatchie Project. This effort concentrated tree planting efforts in an area of Mississippi so that nursery production, vendor services, technical assistance, and inspection were greatly facilitated. Low costs and high survival rates for plantations resulted. In some foreign nations, subsidies for forestry investment are restricted to areas identified as supply zones for industry. Such restrictions lead to economies of scale in both tree planting and harvesting. A similar concentration of effort could be taken in encouraging improvements in wildlife habitat, watershed, or recreation opportunities.

2. Other approaches:

a. Public leasing and management.[13/]--This is the most straightforward means of consolidating small forest tracts. A public management agency or authority would be created by national legislation. The authority would negotiate long-term management leases with woodland owners and be responsible for managing their land in the most efficient and productive manner. Annual rentals would be paid to landowners and deducted from the sale of forest products.

13/ Myers, J.K. Incentives, encouragement, and inducement for the private forest landowner to undertake forest management. 1977. Unpubl. Staff paper, Cooperative Forestry Staff. Forest Service, U.S. Department of Agriculture.

While this approach could be instrumental in bringing large acreages of small forest tracts under management, it has marked disadvantages. The total cost of the program would be high. Many small landowners and others who believe in minimum government involvement would not support such a program.

b. Industrial leasing with public support.[14/] --The basic elements of this approach were developed by William Sizemore, as a consultant to the President's Advisory Panel on Timber and the Environment. The Federal Government would license private companies and organizations capable of assembling and properly managing small forest tracts. The lessee would assemble ownerships into leasing blocks of a size necessary for the practice of intensive forestry. Once assembled, individual landowners in the leasing block would receive annual payments to compensate them for use of their lands. The lessee would manage the land for a period at least equal to the lease period plus one rotation.

A major advantage of this approach is that it stresses both the physical and business consolidation of ownerships. Government's role is limited to licensing, regulating, inspecting, and providing economic incentives in the form of ground rent. Landowners are assured of proper forest management and annual returns, while industry is guaranteed the necessary wood supplies. The program is likely to be very cost-effective if investment periods are short and investments are concentrated on the most productive sites.

c. Forest landowner aggregates.[15/] --This is a relatively new approach to consolidating the forestry activities of small landowners. The best known example of such a program was tried by the Texas Forest Service. Small landowners were contacted and asked to sign a management agreement. The Texas Forest Service then managed the forest land until a sufficient acreage was signed up to warrant the services of a consulting forester. A variation of this approach would be to have public foresters organize the aggregate after which the members individually enter into lease agreements with a forest products company that provides management services and market outlets.

The cost of developing aggregates would be relatively low, since public foresters only serve to bring together interested landowners and manage their forest tracts until sufficient acreage is committed. However, aggregates may not adequately meet the needs of the owners of the smallest acreages or of owners who initially have a low volume of growing stock per acre. Landowners are often reluctant to make long-term commitments. Finally, there is the very real possibility that forest management will receive less emphasis than timber marketing.

14/ Ibid.

15/ Ibid.

d. Federal land bank loans.--In New Hampshire, money has been borrowed by a group of investors to lease over 1 million acres of New England and New York. By selling shares to the group members, money has been raised and invested in those lands.

Taxation

Problems

There are five tax problems that may hinder the practice of forest management on private lands: (1) Inadequate knowledge of the more favorable options available under the present tax laws, particularly with regard to capital gains provisions of the Federal income tax, and the Federal estate and gift taxes (this problem is most serious for nonindustrial landowners); (2) unfavorable Federal income tax treatment of planting and site preparation expenses; (3) inconsistent and unfavorable property tax assessment of forest land; (4) a Federal estate tax system that discourages, to some extent, continuation of forest management of lands changing ownership (this problem has been partially solved by passage of the Tax Reform Act of 1976); and (5) inadequate knowledge by the non-landowning public of the benefits which accrue from forests and the need for public support of taxation favorable to proper forest management.

Favorable tax laws--Federal, State, and local--can be strong incentives for the forest landowner to actively manage his land, especially those owning large tracts and/or those in higher income brackets. Conversely, taxes which are an excessive financial burden or tax laws which are disadvantageously used, can discourage investments in forest management. Federal income and estate taxes and State property and inheritance taxes can each have a direct bearing on the owner's decisions to invest in his property.

Discussion

There are three major taxing authorities that can exert a strong influence on the management and acquisition of private forest land. The Federal Government imposes income, death (estate), and gift taxes. Each State also has a death (primarily inheritance) tax, as well as a property tax. Additionally, State and/or local governments impose one or more of the following: Income tax, gift tax, estate tax, and property tax.

On the Federal side, the Internal Revenue Code (IRC) permits the income received from the sale of timber to be treated as a capital gain, if certain basic requirements are met. Although many landowners may be unaware of this provision, the potential savings can serve as a stimulus to invest in the reforestation of the harvested tract. However, this same IRC does not allow the costs of planting trees and of site preparation to be deducted from the landowner's tax return in the year in which they are incurred. They must be capitalized and recovered when the timber is cut. This can cause serious cash flow problems for the landowner.

Provisions of the Federal estate tax can have a significant impact on heirs receiving forest land as part of an estate. In some cases, it has probably had unfavorable effects with respect to the initiation or continuation of forest management on property passing from one generation to the next. Premature liquidation of the commercial timber has undoubtedly occurred upon occasion when the estate was confronted with an immediate tax bill.

Local and State property taxes also may prevent a satisfactory return on the forestry investment. State inheritance tax laws can also discourage forest investment if they contain provisions such as high rates, immediate payment requirements, and valuation of forest land at full-market value.

Approaches

1. Current approaches:

a. Federal Income Tax.--The law permits capital gains treatment of income received from the sale of timber; certain maintenance costs of growing timber (ordinary and necessary expenses) can be deducted as they occur from the landowner's tax return. However, two major costs--planting trees and site preparation--cannot be expensed, but must be capitalized. This is a financial disadvantage for the forest owner who itemizes deductions. A similar disincentive is the IRC requirement that Forestry Incentive Program payments be reported as taxable income.

A major difficulty is that forest owners often do not use advantageous tax provisions and may not even be aware of them.

b. Federal Estate Taxes.--The Tax Reform Act (TRA) of 1976 has removed some of the unfavorable aspects of previous estate tax provisions. Rules governing paying of the tax allow payment to be spread over 10 years upon a finding of reasonable cause (more lenient than the former "undue hardship") if the value of the property is 35 percent or more of the gross estate.

Assessing and taxing forest land at current market values, like other assets, probably led to some premature liquidation of timber in the past. Valuation at current use is now permitted as long as it does not reduce the estate's value by more than $500,000 and certain other requirements are met. These requirements are quite specific and may restrict application of this favorable provision. The estate tax exemption has been abolished and replaced by a credit which will be increased in steps to a maximum of $47,000 by 1981. At that time, it will be the equivalent of an exemption of approximately $175,000. The new marital deduction is $250,000 or 50 percent of the adjusted gross estate, whichever is greater.

A generally favorable income tax provision pertaining to inherited property was changed by the TRA and may now be a limitation to forest investment. An heir could formerly sell inherited property without having to pay capital gains tax on the amount that the property increased in value while held by the deceased. Now, however, in the case of timberland, there is an apportionment of the total gain from time of acquisition by the decedent to time of disposal by the heir. The gain is apportioned between two periods, pre-1977, which is not taxed to the heirs, and post-1976, which is taxed to them.

c. State Inheritance Taxes.--Most States pattern their inheritance tax laws after the pre-1977 Federal law, so comments made in that section would apply here also.

d. State Property Taxes.--Most States tax forest lands by the ad valorem method, where the timber or the land on which it grows, or both, are assessed at "fair market value" as determined by a local assessor. Inherent inequities in this method are apparent. Most important are the disparities in determining fair market value. Since knowledge and skills of tax assessors vary widely, there is a great variation in the taxes paid on similar forest lands in different jurisdictions. Modifications to the ad valorem system are in effect in about 30 States that attempt to provide differential treatment for forest land. Yield taxes, modified rate and assessment method, exemptions and rebates are being used, but there is little standardization among States.

A recent innovation that holds much promise in achieving a better degree of consistency is "present use" assessment. Value is based on the manner in which the land is currently used, but not necessarily on its highest and best use. The owner establishes the use upon which taxes will be paid. If the use changes, or the land is sold for development, deferred taxes are charged the owner. At least 12 States have adopted present-use tax laws, at least as an option. This method is a preferred alternative, as it provides an opportunity to value forest lands for forest resources.

2. Other approaches:

a. Federal Income Tax Laws and Knowledge of Their Provisions.--A special effort could be made to inform the landowner of the provisions of the IRC. The education and technical assistance programs of the Federal Government have made this information available to foresters, public and private, who assist landowners. Many landowners, however, remain unaware because they do not receive any assistance. A concerted effort is needed to bring this knowledge to them through a combined education and technical assistance effort.

The income tax provisions could be strengthened and made more directly applicable to the private landowner by allowing the deduction of site preparation and tree planting costs in the year in which they are incurred and by exempting incentive payments from income taxation. Although this change would be applicable to all private forest landowners, it is believed that it would be a particularly effective stimulus for the owner of smaller tracts. It would allow the owner to recoup a portion of his investment immediately. There is concern, however, that deduction of these costs would then indicate timber to be an ordinary income item, thus jeopardizing the capital gains provisions. It is proposed that USDA jointly study the feasibility of change with the Department of the Treasury to determine if a change in the Internal Revenue Code would both benefit owners and serve the interests of the Government.

b. Federal Estate Tax Laws and Knowledge of Their Provisions.--While the 1976 changes in the IRC are believed to have generally improved the situation, it is still too early to be certain. Further analysis will be needed to determine if estate tax rules will continue to be a disincentive to private forestry. Of great importance, however, is the need to bring knowledge related to estate taxation to the private forest landowner. The complexities of the tax laws and the difficulties in getting information to these owners in an easily understood way has probably discouraged the initiation or continuation of at least some forest management programs. A concerted effort is needed to educate professional foresters and then, through technical assistance and education, educate the forest owners and the non-landowning public.

c. State Inheritance Taxes.--The major need may be to aline State inheritance tax laws with those laws controlling Federal estate and gift taxes, as amended by the Federal Tax Reform Act of 1976 (described above).

d. State Property Taxes.--The Department of Agriculture is currently assisting the Council of State Governments in a study of State ad valorem and related tax practices and policies pertaining to forest lands. The effects these policies have on revenues, tax administration, timber production, and forest management practices will be examined. The results of the study, expected to be available in late 1977, will be provided to State legislative and executive decisionmakers. At this point, the Department of Agriculture and the Council should jointly advise and assist State and local institutions and other cooperators in achieving sound, equitable, and consisten forest and timber taxation policies.

The American Forestry Association's Trees for People Task Force, in its 1973 report, made several recommendations regarding property taxation. Among these were:

-- Ad valorem taxation should take into account the long growing cycles involved in forest management--perhaps treating timber as a crop instead of real estate.

-- Assessors should be given better guidance in the appraisal and assessment of forest land.

-- Studies should be continued in the use of land capability (productivity) as a basis for assessing forest land.

-- Tax authorities should consider values other than timber production capability in the assessment of forest land, possibly allowing credits or rebates for practices that improve watersheds, provide good wildlife habitat, improve the environment, or maintain scenic vistas.

Labor and Equipment

Problem

The local availability of labor and equipment for the production and protection of recreation, wildlife, or any other resource values on private forest land is related to the supply of these inputs for timber production.

Forest labor and equipment are not bottlenecks to increased production on the large holdings of integrated forest products companies. These large owners have the incentives and the resources to solve their own problems. There is serious concern, however, about the availability and effectiveness of labor and equipment to meet developing needs on small, nonindustrial, and private woodlands.

Discussion

Across the country, delivery systems to perform needed forestry services on small ownerships are not adequate. To illustrate, allocations of FIP monies in some States have gone unspent. On the other hand, some States, such as North Carolina, have taken great advantage of the FIP program. One explanation for the successes is the availability of a developed educational and technical services delivery system through which the State performs recommended forestry services at cost, if local vendors cannot be found to do the work. Nursery facilities in North Carolina are part of the delivery system and have been flexible enough to meet the increased demand for planting stock.

There are a number of interrelated reasons why the free market is not meeting the manpower and equipment needs on nonindustrial private ownerships:

Manpower.--The typical private landowner does not depend on forestry as his primary means of support. He may be unable or uninterested in doing forestry work or supervising that of others and may live far from his land. Woods labor is among the most hazardous of occupations; yet, in many parts of the country, wages are still too low to overcome the disadvantages and dangers of outdoor work and to attract skilled workers. Certain phases of forestry work are seasonal (e.g. tree planting) which mitigates against the maintenance of a stable work force. The demand for work on nonindustrial private lands in the past has generally not been sufficient to justify the widespread development of work crews specializing in work on small private holdings.

Equipment for Regeneration.--Years of high-grading have left many private forest acres stocked with cull trees and unmarketable species. Frequently, the only way to achieve even moderate timber production is to remove existing vegetation and plant or seed with desirable stock. Heavy, expensive, and specialized equipment is needed. Owners with a limited acreage cannot justify owning and operating such equipment. The economies of scale make it relatively more expensive to operate such equipment on small tracts. Private contracts cannot invest in the equipment or specialize in forestry work on private lands unless there is sufficient demand.

Contractors in some States were advised to gear up for the FIP program in 1974, but many were forced to get out of the business when delays and reversals in FIP funding occurred. Some of the problems in attracting vendors to the business have been overcome in States, such as Virginia, when the State has used cost-sharing monies to smooth out the more uncertain and irregular flows of Federal funds.

It is likely that the big equipment and intensive silvicultural systems developed for growing timber by the large industrial landowners are not the most economical systems for owners of small tracts to use. Research and development of systems for serving relatively small ownerships are needed.

Equipment for Harvesting.--As farming has become mechanized, rural labor has migrated to urban areas. As a consequence, it has become more expensive and more difficult to hire labor for work in the woods. The response of the forest industry to this situation has been to develop highly mechanized, capital intensive harvesting systems. Such systems cannot operate profitably on small tracts; nor are such systems feasible for partial cuts in overstocked stands. Thus the small landowner has difficulty marketing timber. Inability to make improvement cuts and thinnings because of high harvesting costs is a serious problem for small private landowners who want to practice intensive forestry.

Approaches

1. Private approaches:

The major forest products companies in many areas of the country have established landowner assistance programs to perform forestry services at cost. These programs are emerging as an important element in the solution to such problems.

a. Some private companies offer technical services to private forest landowners, usually in exchange for the first option to bid on timber when products are sold.

b. Free planting stock is made available in some areas by private timber companies.

2. Federal approaches:

Many of the problems related to manpower and equipment on private land will be solved, by private entreprenuers when sizable and continuous demands for vendors services are generated. In developing private vendors' services, however, it is critical that the local public forestry agency that offers technical advice to the landowner be able to locate and coordinate vendors to perform recommended services and to check for compliance in vendor contracts.

a. Actions could be taken to reduce fluctuations in FIP funding to create a more stable and predictable demand for woods labor and equipment contractors.

b. The procurement of expensive, specialized forestry equipment, such as drum choppers, heavy disks, and wildland tree planters by State agencies, conservation districts, or landowner cooperatives for rent to private vendors or for operation by local agencies at cost where vendors do not come forth could be encouraged.

c. Research and development efforts for more cost effective systems for accomplishing forestry work on relatively small private tracts could be funded. More specifically, research is needed on silvicultural systems, equipment systems, and technology, such as containerized seedlings which would reduce the seasonality of forestry operations.

d. The utilization of Job Corps, YCC, conservation district crews, and other programs and participants as sources of labor could be intensified.

e. Efforts could be intensified to coordinate and help finance education and training of organizations such as conservation district crews and other members of the woods labor force to develop safe, versatile, more productive workers and to attract more skilled people into woods labor.

f. Continuing education of loggers could be better supported in fields such as safety, recordkeeping, business management, logging systems, environmental protection, and techniques to enhance forest-related amenities.

State Forestry Planning

Problem

Constantly increasing pressures on our forest land base have been felt at all levels of government. The resources of State and local institutions have been stretched by requirements to identify their principal needs, to work with Federal Agencies charged with improving the conditions on forest lands, to serve as the major medium for conducting a variety of programs on non-Federal forest lands, and to plan and conduct programs to meet Federal environmental standards for water and air quality protection.

State and local institutions are critical links in getting action on the ground. They must have the ability to target their most pressing needs and to serve as effective means of implementation.

Discussion

There are three closely related areas where State activities are critical if Federal programs are to have their maximum influence on private forest resources: In planning, in budgeting, and in implementing programs.

Planning.--It has long been accepted that local agencies with the involvement of private landowners and in cooperation with the Federal Government can better define needs and real opportunities for developing private forest land resources than can the Federal Government acting alone. Because there currently exist few comprehensive statewide forest resource plans that identify locally developed needs and the priorities for meeting those needs, it is difficult to formulate effective Federal programs.

Developing comprehensive forestry plans has the potential of providing a single vehicle to replace the current fragmented approach of providing Federal funds to States. For example, States generally have consolidated outdoor recreation plans, already have or are developing consolidated fish and wildlife plans, are currently developing area-wide water quality management plans, and may have some sort of consolidated plan concerning timber. Each of these kinds of plans serves as a useful vehicle for enhancing particular forest resources. Drawing from such functional plans to develop comprehensive plans to speak to all needs of forested lands would provide a framework through which all Federal activities aimed at such lands could be channelled.

This is the approach now being taken as a result of the Forest and Rangelands Renewable Resources Planning Act of 1974. Each State is defining major issues, needs, goals, priorities, and alternative action programs. This work is fundamental to developing Federal activities intended to help resolve problems on non-Federal forest lands.

Such a planning effort requires both dollars and technical skills in each State. To the extent that either kind of resource is not available, the whole planning process will be ineffective.

Budgeting.--The present system leads to State budgets based only on estimates of potential Federal financial assistance. States frequently must submit their budget requests to their legislatures well before Federal Agencies formulate their budget requests. Usually, the 20 States on a biennial budget have received their appropriations before the Federal appropriation for the first of those 2 years has been made. This makes it difficult to develop a long-range program which can smoothly phase out completed efforts and meet new challenges.

The critical need is to develop budgets in a multi-year context so there is not an annual crisis in every activity. Providing such a framework is a major intent of the comprehensive forestry plans discussed earlier. Given realistic estimates of what needs to be and can be done for the next 5 years at the State level, annual Federal budget requests can quickly be developed that are responsive to needs and priorities.

Implementation.--The individual State and local agencies provide an important delivery system for getting action on the ground. The effectiveness of this job is directly dependent upon the preceding planning and budgeting. Budgets that are not stable or smoothly phased in or out may lead to inefficiencies, a loss of credibility, and a diminished ability to deliver results in the future.

As in the case of planning, Federal assistance in strengthening the technical capabilities of State and local agencies pays off by making Federal efforts more effective on the ground. There is a long history of cooperative forestry programs that have helped in this strengthening. The oldest efforts are those in protecting non-Federal forest resources. Particularly in protection from fire, State organizations have assumed an increasing proportion of the total effort as their capabilities have increased. Federal technical assistance and seed money for planning and initiating such programs have served as catalysts.

Approach

A coordinated planning-budgeting-implementation process is needed whereby all private forest resource development and environmental planning and programs complement each other. Assisting in the fundamental strengthening of State and local agencies and in the development of comprehensive plans for the forest land base of each State, in the long run, offer highly cost-effective opportunities for Federal expenditures. Such an approach is consistent with the Resources Planning Act.

APPRAISAL OF POSSIBLE APPROACHES

The previous section included discussions of a large number of existing and possible approaches available to the Federal Government to stimulate the further development of forest resources on private nonindustrial lands. In order to choose among these possibilities, it is necessary to somehow determine which ones will likely yield the most desirable total packages of benefits. In this section, existing historical appraisals of the previously described approaches are briefly summarized. Then a method of making a consolidated appraisal of the alternative approaches is defined and the results are presented.

Historical Appraisals

The Federal Government's forestry programs directed to private forest lands have been the object of several analyses. These are cited and discussed and each study's pertinent conclusions summarized in appendix B.

Recent public interest in timber supply in relation to the Nation's lumber and plywood needs has led to several examinations of the Federal Government's forestry programs. These analyses were conducted by both public and private organizations. They considered the entire range of programs and present both broad and specific recommendations for Federal action. In general, the reports support the present array of Federal efforts, although recommendations are offered to redirect or strengthen certain components. Internal policy papers, developed by the Department of Agriculture at the direction of the Office of Management and Budget, consider several issues that relate to the Federal Government role. Technical assistance and cost-sharing programs were examined in these papers.

Federal support for education has been a keystone to the development and transmittal of knowledge for use. The value of such activities has been tested and proven in agricultural production and in agricultural marketing. Because extension education focuses on problem-solving, it has direct meaning to millions of people. While Federal funding for extension education has been generous for traditional agricultural programs, it has been relatively meager for forest resources educational programs. Another funding problem has occurred when incentive programs, such as FIP, and expanded service forestry programs have been funded without companion funds for education.

The cooperative technical assistance program carried out by the State forestry agencies has been examined in detail within the last 5 years. The conclusions support continuation and expansion

of the program but with redirection of Federal administrative procedures to improve program delivery and increase efficiency. There have been no formal analyses of those broader technical assistance efforts of the Department of Agriculture that complement the State forestry agency efforts (more-than-proportional increases in forest management activities following expansion of such programs are suggested by informal analyses). Similarly, no formal examination has been made of the technical assistance efforts of consulting foresters or of the forest industry.

The Federal cost-sharing programs have received the most attention. Six studies of the two programs dating back to 1960 consider the effectiveness of the government's provision of cost-share funds; only one, however, is nationwide in scope. The rest examine application of the program in specific counties or States. In addition, an in-depth analysis of the forestry cost-sharing programs is presently underway, as required by the authorizing legislation. Opposite conclusions are reached in the studies on the effectiveness of government expenditures. Generally, the studies conclude that the incentive provided by cost-sharing does stimulate landowner action; it is the application of the program in terms of efficiency and effectiveness that is found wanting. There has been little in-depth analysis of the more specific incentive-type approaches. Refinements in the cost-sharing programs, credit and insurance proposals, and modifications to Federal and State tax laws have been only generally evaluated. Such evaluations have usually been part of the proposals.

Evaluating Possible Approaches

The historical appraisals have been concentrated on those programs where effects are easiest to measure. Almost without exception, they have considered only the production of commercial timber. And, with minor exceptions, different kinds of programs have not been compared.

For purposes of the present report, where general recommendations must be made about quite different sorts of programs, a more comprehensive approach has been taken. It consists of the following steps:

1. Define criteria that are appropriate for evaluating Federal efforts to influence the activities of owners of nonindustrial forest lands,

2. Summarize the approaches discussed in the preceding section of this report,

3. Apply each criterion to each possible approach, and

4. Draw conclusions.

The following criteria reflect both the President's direction for this study and measures to ensure that expenditures are cost-effective.

1. Importance of Problem.--How important is the problem that each approach is intended to solve.

2. Federal Cost.--An estimate of the magnitude of Federal funding required to carry out each approach. It does not consider costs to landowners and others.

3. Federal-State Coordination.--An estimate of the degree of coordination required to plan and carry out each approach.

4. Implementation Feasibility.--An estimate of the likelihood that the program and/or approach can be fully implemented or expanded.

5. Complementarity with Private Activities.--An estimate of the potential positive impact of the approach on similar activities by the private sector.

6. Improvement of Direct Private Investment.--An estimate of the degree to which the approach will stimulate an additional quantity or quality of non-Federal investment.

7, 8. Improvement of Commodity Output and of Other Resource Output.--Estimates of the effect of each approach in terms of producing additional commodities or other resource values.

9. Beneficial Environmental Effect.--An estimate of the positive impact that the approach is likely to have on the total environment.

10. Certainty of Success.--An estimate of the relative likelihood that the goals or objectives of the approach would be achieved.

11, 12, 13. Impact Over Time.--Estimates for three time periods to indicate the rate at which the approach could be accepted, adopted, and become effective in influencing resource development (Near Future: by 1970; Short-term: 1980-1985; Long-term: 1985-2000).

14. Cost-effectiveness.--A comparison of the effectiveness of the approach per unit cost and its ability to increase the production of forest resource values.

In the preceding section of the report, a variety of possible approaches was discussed. Those approaches have been summarized and are listed on the left side of table 3. (The first column provides

a cross-reference to the page containing the principal discussion.) Roman numerals indicate the general category of the approach, letters indicate either subcategories or very broad kinds of approaches that could not be disaggregated, and numbers indicate relatively specific approaches. Adjectives preceding the solutions, such as "expand" and "encourage" provide general indications of the nature of the approaches.

The entries on the table are the results of applying each criterion (columns) against each approach (rows). Because no empirical evidence exists for these appraisals (with the few exceptions mentioned under Historical Appraisals, above), the ratings are necessarily subjective. The following ratings were used:

H -- High
M -- Moderate
L -- Low
N/A -- Not Applicable

A concerted effort was made to make the ratings between approaches consistent. To the extent this is true, for each criterion three groupings of approaches were made. However, care must be taken in interpreting the ratings because of differences in the scale of the approaches.

One other problem inherent in this appraisal is that approaches are evaluated one at a time. In fact, combining approaches can nearly always be expected to have substantial synergistic benefits: the total will be greater than the sum of the parts.

TABLE 3.--Subjective Appraisal of Possible Federally-Supported Approaches

PRINCIPAL DISCUSSION	APPROACHES	CRITERIA: IMPORTANCE OF PROBLEM	FEDERAL COST	FEDERAL STATE COORDINATION	IMPLEMENTATION FEASIBILITY	COMPLEMENTARY TO PRIVATE ACTIVITIES	IMPROVEMENT OF DIRECT PRIVATE INVESTMENT	IMPROVEMENT OF COMMODITY OUTPUT	IMPROVEMENT OF OTHER RESOURCE OUTPUT	BENEFICIAL ENVIRONMENTAL EFFECT	CERTAINTY OF SUCCESS	IMPACT OVER TIME: Near Future	IMPACT OVER TIME: Short-term	IMPACT OVER TIME: Long-term	COST-EFFECTIVENESS
	I. EDUCATION														
26	A. Expand education of forest landowners	H	L	H	M	H	H	M	M	H	M	L-M	M	H	M-H
26	B. Expand education of forestry professional	L-M	L	H	H	N/A	M	M	M	H	M-H	L-M	M	M	M
26	C. Expand education of general public	H	L	H	M-H	H	L	L	M	M	L-M	L	M	M	L-M
29	D. Expand research (private forest landowners)	H	L	H	M	M	M	M	M	H	M	L-M	M	M	M
	E. Increase knowledge of tax requirements:														
45,46	1) Federal capital gains provisions and estate tax laws	H	L	H	H	N/A	H	M	M	L-M	L	L	M	H	M
46,47	2) State tax laws	H	L	H	L	N/A	H	M	M	L-M	L	L	M	M	L
49	F. Training of woods labor force	H	L	H	H	H	M	M	L-M	M	M-H	L-M	M	M	M
	II. TECHNICAL ASSISTANCE														
	A. Expand direct public technical assistance														
27	1) Expand forest management	H	M	H	H	H	M	H	M	M	M	M	M	H	M
27	a. Priority of Service concept	H	N/A	H	M	H	M	H	H	M	M	L	M	M	H
27	b. Improved delivery system	H	N/A	H	M	H	M	H	H	M	M	L	M	M	H
28	c. Unified and consistent Federal approach	H	N/A	H	M	M	M	M	M	M	M-H	M	M	M	H
37,38	2) Forest Protection	H	L	H	M	H	H	M	M	M	M	M	M	M	H
	B. Increase role of consulting foresters														
28	1) Encourage technical assistance by consulting foresters	M	N/A	L	M	N/A	H	H	L	L	M	L	M	M	H
28	2) Support technical assistance by consulting foresters	M	L	L	M	N/A	H	H	L	L	M	L	M	M	M
28	C. Encourage assistance provided by forest industry	M	N/A	L	M	N/A	H	M	L	L	M	M	M	M	M
	D. Expand research														
51	1) Equipment development for small ownerships	H	M	M	H	H	M	M	L	M	H	L	M	M	M
38	E. Encourage States to strengthen effectiveness and use of trespass laws	M	L	L	L	N/A	N/A	L	M	M	L	L	M	M	L-M
46,47	F. Encourage consistency in application of forest land taxes	H	L	M	L	N/A	M	L	L	L	L	L	M	H	L-M
40	G. Support formation of forestry cooperatives and associations	H	M	H	L-M	N/A	M	M	M	M	M	L	M	H	H
41	H. Encourage forestry industry leasing	H	L	M	L	H	M	M	L	L	L	L	L	L	M
41	I. Develop public leasing and management	H	H	M	L	M	M	H	M	M	M	L	M	M	M
42	J. Develop industrial leasing with public support	H	M	M	L	M	M	H	M	M	M	L	L	L	L
42	K. Encourage formation of forest landowner aggregates: (with consultants)	H	L	M	M	M	M	M	L	L	M	L	M	M	H
	L. Development of private sources of labor and equipment:														
51	1) Encourage development of a corps of vendors	H	L	M	M	H	M	M	L	M	M	L	H	H	H
51	2) Support development of corps of vendors	H	M	H	M	H	M	M	L	M	M	M	H	H	H
27	M. Establish market and price reporting system	H	L	H	M	M	H	M	L	L	M	M	H	H	H
	III. INCENTIVES														
31,32	A. Expand cost-sharing	H	H	H	H	N/A		H	H	M	M	M	H	H	M
32	B. Initiate credit-loans	H	H	M	M	H	H	M	M	M	M	L	M	H	M
33	1) Lump-sum	H	H	M	M	H	H	M	M	M	H	L	M	H	M
33	2) Forgiveness	H	H	M	M	H	H	M	M	M	M	L	M	M	M
33	3) Low-interest-deferred payment	H	H	M	M	H	H	M	M	M	M	L	M	M	M
34	C. Annual payment to landowner/tree bank program	H	H	H	L	H	M	H	L	L	L	L	M	M	M
34	D. Interest subsidy for real estate mortgage debt	H	M	H	L	H	M	M	M	L	L	L	M	M	M
34	E. Commodity price support	H	L	H	L	H	M	M	M	L	L	L	L	L	M
	F. Insurance														
37	1) Encourage private forest insurance	M	M	M	M	M	L-M	M	M	M	M	L	M	M	M
37	2) Initial public forest insurance	M	L	M	M	H	L-M	M	M	M	M	M	M	M	M
	G. Taxes														
46,47	1) Annual deduction of reforestation costs	M	L	L	M	N/A	M	M	L	L	M	L	M	M	M
47	2) Encourage state to make inheritance laws consistent with Federal estate tax laws	M	L	H	M	N/A	M	M	L	L	L	L	M	M	M
46	3) Promote (encourage) present use tax assessments	M	L	H	M	N/A	M	M	M	L	L	L	M	M	M
48	4) Tax rebate to recognize noncommodity forest land uses	M	L	H	L	N/A	M	L	M	M	L	L	L	M	M
	IV. STATE FORESTRY PLANS														
54	A. Develop State forestry plans	H	M	H	H	N/A	M	M	M	M	H	M	H	H	H

LEGEND: N/A -- Not Applicable
L -- Low
M -- Moderate
H -- High

CONCLUSIONS

Four general types of approaches to the problems have been presented:

-- education
-- technical assistance
-- incentives
-- assistance to States in developing State forestry plans.

All of these are being used to some extent currently and all of these are complementary.

Summary of Approaches

General education programs to inform landowners of opportunities for protecting and managing their lands in an environmentally sound manner and of sources of assistance are relatively inexpensive and a prerequisite to success in gaining wide participation in other programs. A good educational program provides the landowner a rational basis for deciding how to manage his land--whether to more fully develop any particular resource potential or to enjoy it in its undisturbed condition. Education also helps the public at large to understand the environmental considerations and alternatives in the management and protection of all forest resources.

Technical assistance and services must be available to the landowners who decide to develop their forest resources. As a group, nonindustrial landowners do not have the skill or equipment or management or market information necessary to successfully carry out management activities; nor are they capable of protecting their lands from losses due to fires, insects, diseases, or trespass. Frequently, they do not understand how one forest resource use can complement another. Measures should be taken to ensure the local availability of technical services. To improve the delivery system, application of a priority-of-service concept to all programs and encouraging the formation of groups of landowners would have high payoffs. The needs for all kinds of technical assistance and services would increase if incentive programs were expanded.

Incentives through cost-sharing are relatively expensive in terms of Federal expenditures, but they have high cost-effectiveness and lead to large impacts on the ground when properly designed and administered. Early in this report (fig. 1), it was shown that there are many opportunities to stimulate timber production on private nonindustrial ownerships through cost-share programs at a lower per-unit-output cost to the Federal Government than on the National Forests. In fact, the total costs of such timber production--public plus private costs--will often be less on these ownerships.

Effective expansions of incentive programs require similar expansions in educational and technical assistance programs. In addition, if priority-of-service based solely on environmental and resource management objectives (rather than also being designed to meet other national objectives) could be followed and/or if other changes previously discussed were instituted, the impacts on resources of incentive programs would increase significantly.

Experience shows that, while substantial increases in stumpage prices do lead to increased timber harvests, they do not lead to much greater investments in tree planting or other management activities by the owners of nonindustrial forest lands. But experience in the Soil Bank Program also indicates that these same owners will substantially increase such investments when stimulated by cost-sharing or other direct incentives--when such programs are operated on sufficiently large and stable bases.

Tax policies and credit availability require further analysis in cooperation with other units of government before specific conclusions can be drawn. Both areas are clearly important.

State forestry planning should be encouraged because it is a cost-effective means of guiding expenditures of Federal and State funds to achieve both environmental and forest management goals. The appraisal of possible changes in approaches found in the preceding section of this report looks at forest resources from the national perspective. It must also be recognized that specific approaches best for any one geographic area may be considerably different from those suited to another area. State forestry plans permit States to select the approaches that work best for them. Federal help to States to strengthen State planning efforts can also result in better coordination between agencies and a more effective combination of approaches at the State level.

Relating the Approaches to the Environmental Message

This report has focused on the general problems that have impeded the conservation and management of private nonindustrial forest lands and the approaches available to the Federal Government to resolve them. These approaches are relevant to the concerns of the Environmental Message in the following ways:

Increasing wood supplies; controlling fires, insects and diseases.--For the most part, obstacles on nonindustrial ownerships to increasing wood supplies are also obstacles to enhancing any other forest resources. They can be summarized as: Too little knowledge of and the

inability to apply available knowledge on the ground, and a lack of adequate financial resources or incentives. Numerous approaches to overcoming these obstacles have been discussed. Controlling fires, insects, and diseases is necessary if investment opportunities are to be financially attractive; such control is fundamental to protecting all the resource values on forest lands.

Emphasizing multiple-use management.--As a practical matter, it is highly desirable to concentrate efforts to enhance noncommodity resources on lands where commodity resources can also be produced. Where commodity outputs are of primary concern to the landowner, he will ordinarily be quite willing to take other forest values into consideration so long as, in his judgment, the additional costs are acceptable. The first requirement is that he understand how his resources are interrelated.

Strengthening State and local agencies; comprehensive State forestry planning.--In most instances, the Federal Government relies on State and local agencies to implement programs aimed at private forest lands. The technical capability of those agents is critical. There has been a long history of cooperative efforts across a wide range of programs, including fire, insect and disease control, incentive programs, technical assistance to landowners and general education. Cooperative planning is critical. A new step would be to work with the States to develop a "model State plan" that would provide an acceptable vehicle for Federal funding. Within the Federal establishment, this would require defining exactly what is wanted and ensuring that Federal efforts are coordinated with such a plan.

Supporting national environmental goals; improving fish and wildlife habitats.--National environmental concerns are embodied in a complex of Federal laws, policies, and regulations. They can be characterized as encompassing the noncommodity resource values of forest lands, including the soil, water, and air resources. A number of specific laws and programs are designed to conserve or enhance particular environmental values, and any expenditure of Federal funds must be consistent with the entire range of concerns.

It is apparent that both the implications of specific programs to the concerns of the Environmental Message and the cost-effectiveness of such programs depend upon the manner in which activities are conducted on the ground. Therefore, it is recommended that any program should be implemented in accordance with the following principles:

1. All Federal expenditures must be made in a manner consistent with, and supportive of, laws and policies relating to national environmental goals.

2. The impacts of all potential Federal expenditures on the entire complex of forest resources should be carefully evaluated. Adequate protection will be provided to forest, soil, air, and water resources and to critical habitats of threatened or endangered species of flora and fauna.

3. Preference should be given to spending Federal dollars in a manner that strengthens the capabilities of State and local agencies.

4. In instances where concerns are place-specific and resource-specific because private forest lands are critically located--perhaps because they contain the headwaters of frequently flooding rivers or scarce habitats for an endangered animal--precisely drawn prescriptions to bring about specified changes on those lands should be required.

5. In the more general case where many alternatives for on-the-ground Federal expenditures exist, priorities should favor stimulating the joint production of marketable and nonmarketable goods and services, placing emphasis on "best management practices" for all resources. Criteria to be considered in programs to specify areas for investment, and in developing priority-of-service guidelines, should include:

a. receptivity of landowners to the programs,

b. relative cost-effectiveness of stimulating the production of marketable outputs,

c. location of each area relative to the location of the intended users of the resource values that are to be enhanced,

d. likelihood that nonmarketable goods and services will be enhanced, and

e. probability of serious resource loss unless corrective action is taken.

6. Any expenditure of Federal dollars through incentive programs should be made in the context of an agreement with the landowner to ensure accountability of expenditures.

The following two recommendations are based on difficulties encountered in defining and appraising approaches available to the Federal Government:

-- A system for determining and monitoring the success of all programs intended to encourage and assist forest landowners to better protect, manage and use their forest resources should be implemented as soon as possible.

-- An integrated and continuing program to develop the information necessary to more effectively design, implement, and redirect the above programs should be established.

APPENDIX A

THE WHITE HOUSE

WASHINGTON

May 23, 1977

MEMORANDUM FOR

THE SECRETARY OF AGRICULTURE

Today, I delivered my Environmental Message to Congress. A copy is enclosed. It contains these specific directives to you and your agency:

° undertake a comprehensive study of the Cooperative Forestry Programs. This study should examine the desirability of providing financial assistance to state forestry agencies on the basis of state forestry plans rather than through the present fragmented approach and should consider the need for measures to:

- assure that forestry programs support national environmental goals;

- assure that assistance to non-Federal forest owners will emphasize interdisciplinary planning and multiple use management;

- improve the capability of private forest lands to meet the nation's need for wood;

- prevent and control pollution, fires, and insects and diseases that damage forests, using environmentally sound methods, such as biological pest controls;

- improve and maintain fish and wildlife habitats particularly those that are critical for threatened and endangered species;

- strengthen planning and management capabilities of state and local forestry agencies.

- expedite the preparation of proposals for wilderness areas in Eastern National Forests, the National Grasslands, and in Alaska.

- review, in cooperation with the Secretary of the Army, other appropriate federal agencies, and the Governor of Florida, available studies and findings, and make recommendations to me within 120 days on the alternatives for restoration of the Oklawaha River portion of the Cross Florida Barge Canal Project, and on the alternatives for disposition of the facilities and lands of the Cross Florida Barge Canal Project outside the Oklawaha River area.

- develop, in cooperation with the Secretary of the Interior, legislation restricting importation of exotic species to the United States.

Please give these assignments your immediate attention.

Jimmy Carter

Enclosure

APPENDIX B

Studies of Effectiveness of USDA Activities on Private Forest Lands

Several studies of federally supported forest programs directed to private forest lands are available. Most of these are of recent preparation and should be of value in analyzing program proposals. Nearly all are oriented to analysis of issues relating to timber supply and demand. This is a result of heavy emphasis on this subject in the last 10 years, as public concern has grown over rising softwood sawtimber prices and effects on national housing goals. Consideration is given, however, in several of the reports to nontimber uses of the forest and the opportunity for a balanced program.

The National Association of State Foresters (NASF) in 1968 proposed an in-depth study of the Cooperative Forest Management Program. A seven-part study plan was developed cooperatively by NASF and the Forest Service. Specific studies were carried out in the period 1969-73, and a summary report was published in 1975. McClay (2)[1/] conducted a literature review as Part 2 of this study and from that developed a list of factors for rating nonindustrial private forest owners' willingness and/or ability to fulfill the goal of increased timber productivity and supply. The author stresses that a rating system should incorporate diverse rating systems adapted locally. Three groups of factors are presented: (1) Landownership, (2) Financial Situation, and (3) Attitudes and Characteristics. Each specific characteristic is assigned a rating from an opportunity rating range, generally expressed as high to low or most to least. Owners who compile a high composite rating would serve as the focus of technical assistance, education, and incentive programs.

Westat, Incorporated (5) studied the forest management planning and timber marketing activities of the Cooperative Forest Management (CFM) Program and determined which characteristics of the land, the owner, the forester, and the plan contributed to the success of the assistance--as determined by owner adoption of advice. Recognition of these characteristics could be used to guide delivery of technical assistance programs. A related study by Midwest Research Institute (3) examined the opportunities for improving resource management by providing technical assistance for the production of nontimber benefits on private forest land. It examined present and anticipated nontimber uses of private-forest lands and the response of public technical assistance to them. A redirection of the CFM Program to recognize landowners' nontimber objectives and increase assistance toward this end is recommended.

The Forest Products Utilization component of the CFM Program was analyzed by Greenacres Consulting Corporation (1). It related characteristics of personnel and program administration to successful adoption of assistance. An expansion of the Program is recommended to increase the Nation's wood supply through better utilization of the forest resource. The Forest Service's Summary Report of the CFM Study (4) lists 18 recommendations to guide the development of the CFM Program.

1/ Italic numbers in parentheses refer to Current Studies and Literature Cited on page B-6.

Beasley and Holland (7) analyzed the behavior of forest landowners in two Illinois counties and predicted the reasons for likely success or the lack of success for several alternative government programs. They concluded that past efforts to reach these owners and to encourage timber output and forest management had not yielded significant positive results. This was because the public programs had not related well to objectives and motivations of owners. They recommended that instead of a general program based on education and technical assistance, the public programs should be tailored to specific owner groups. Recognition of the variables that distinguish these groups will help tailor public programs.

An unpublished doctoral dissertation by Ellis (8) analyzed cost-effectiveness of Federal program opportunities for relieving softwood timber supplies. Three types of Federal programs are analyzed: (1) National Forest reforestation and stand improvement, (2) cost-sharing of reforestation and stand improvement on nonindustrial, private forest lands, and (3) technological research and development. The analysis concluded that certain technological improvements offer the most immediate means of overcoming supply problems. Reforestation on private lands should be most cost-effective for long-term improvements in timber supply, while silvicultural investments on National Forests should be most cost-effective in the short term, since activities undertaken would affect timber supplies sooner.

The General Accounting Office (10) reviewed the effectiveness of USDA forestry programs, concentrating on the Cooperative Forest Management and Forestry Incentives Programs (FIP). This analysis was based on the opportunity for increasing softwood sawtimber production of private, nonindustrial forest land. The report concluded that program effectiveness could be increased if the Department of Agriculture and the States cooperated in planning and directing the programs toward the goal of increasing the softwood sawtimber supply. To do this, modifications in planning, fund allocation, and reporting procedures will be required.

Several studies of government cost-sharing programs on private forest lands have been made. The most recent of these by Mills (14) analyzed the cost-effectiveness of the 1974 Forestry Incentives Program when measured by the four indicators of cost-effectiveness: Tract size, type of practice, per acre treatment costs, and site productivity. He concluded that the program performance was generally favorable. Enough problems were apparent to warrant changes in program operations; thus, four recommendations were proposed: (1) Tract size treated should exceed 10 acres, (2) maximum cost-per-acre limits should be set in accordance with costs that produce acceptable financial returns and are commensurate with the availability of low-cost investments, (3) reasons for large per-acre cost variation should be determined and resolved, and (4) a new funding apportionment procedure should be developed which incorporates ability to deliver the program. Mills cites in his paper

earlier evaluations of cost-sharing programs. Manthy (12) examined Agricultural Conservation Program (ACP) payments in selected counties in Pennsylvania. A study of ACP payments in southeastern Ohio was made by Mendel (13). Benson and Skok (6) examined soil bank tree plantations in Minnesota. These studies indicated deficiencies in application of the cost-share that made the program less than fully cost-effective. Gregersen, Houghtaling, and Rubinstein (11) used the 1972 Rural Environmental Assistance Program's tree planting practice as a case study in an examination of the economics of public forestry incentives programs. They found that 41 percent of the acreage studied could not provide an acceptable return on investment costs--6-7/8 percent.

In a separate but related study in 1976 of the Forestry Incentives Program, the Agricultural Stabilization and Conservation Service analyzed the effectiveness of the program (24). The unpublished report concluded that FIP had been successful in bringing about investments in timber production on nonindustrial private forest lands and that the projected value of the benefits exceeded the cost of the investments. It further concluded that, at the current funding level ($15 million appropriated in FY 1975 and FY 1976), FIP would not provide enough additional timber to prevent a real price increase between the years 2000 and 2020. Four recommendations are presented to modify or enhance program application.

In a related paper, Mills (15) set forth investment priorities for small forest owner assistance programs. He states that public programs to encourage timber production can be efficient only if investments are ranked according to a specific priority scheme, a prerequisite to which is a concrete, operational program goal.

Mills also has an extended study of the 1974 Forestry Incentives Program underway with publication expected in late 1977. A sample of cost-share cases will be analyzed through onsite evaluations that collect tree planting or forest stand condition data. A study of the retention of trees planted under the Soil Bank and Agricultural Conservation Programs in several Southern States is also underway by the Southeastern Area office of the Forest Service.

The Report of the President's Advisory Panel on Timber and the Environment (16) contained a broad analysis of forestry in the United States. It discussed general timber supply problems and included an extensive consideration of public programs for private forests. It concluded that the major goal of National Forest policy must be to achieve a relatively high timber harvest from private forests, calling this class of ownership the "listless giant of forestry." The Report recommended that present Federal and State programs to aid the small private forest owner be continued but suggested more consideration be given to forest landowners' objectives. Encouragement was given to develop new approaches aimed at increasing timber outputs from private lands.

Sizemore (17) in an appendix to the Panel's Report entitled "Improving the Productivity of Nonindustrial Private Woodlands" presented a comprehensive analysis of all Federal and State programs aimed at private-forest lands. He presented a proposal for increasing timber productivity on private lands that is based on the leasing concept. Small forested holdings would be aggregated into economically operable units in order to practice intensive forestry. Federal and State Governments would provide the initiative in getting the contracting parties together and perhaps license and monitor the lessee.

The Southern Forest Resource Analysis Committee's 1969 report, "The South's Third Forest" (18), described the overall forestry situation in these 12 States. The report estimated that timber cut from Southern forests in the year 2000 would be 2.3 times the current cut. Public and private programs, present and projected, are described as wholly insufficient to ensure that this level of harvest is achieved. "Bold new approaches" are called for, several of which are suggested in the report. Fourteen key needs to meet the year 2000 timber production objective are described with recommendations for public and private programs. While these are directed to Southern forestry, they are worthy of consideration for the entire United States.

Several USDA "issue papers" have been prepared which consider the role of the Federal Government in increasing timber supplies from nonindustrial, private lands. These papers were prepared at the direction of the Office of Management and Budget in connection with advance preparation of the fiscal year budget. A preliminary draft report for the fiscal year 1974 budget (23) presented several opportunities for increasing timber supplies on both public and private lands. The paper stated that increased Federal investments on the nonindustrial, private lands had a larger potential for providing long-run supply increases than would similar increases on the National Forests. Two reasons were offered: The current level of investments on these lands is relatively low in comparison with that on Federal lands, and these lands generally have higher inherent productive capacity than Federal lands. Programs of reforestation, timber stand improvement, protection from insects and diseases, and harvesting and utilization improvements were evaluated.

A 1970 issue paper examined opportunities for expanding timber production on nonindustrial private forest lands (22). The paper was addressed primarily to the issue of Federal cost-sharing incentives from private owners and, as such, was used to support later efforts directed to the Forestry Incentives Program. A 1973 unpublished staff paper provided by USDA in response to questions raised by OMB examined the issues relating to forestry incentives (20). The paper discussed the question "Is There a Public Problem?" as the basis for providing cost-sharing funds. Several program suggestions were made to overcome difficulties in increased forest management on private lands. A 5-year pilot program was suggested to test various program alternatives.

The Forest Service's "Outlook for Timber in the United States" (21) reported on the Nation's timber supply and demand situation and considered all commercial forest lands. The conclusions indicated substantial increases in demand, while outlook for timber supplies indicated limited increases which will differ widely by ownership and by regions. Although the report was oriented primarily to timber, it recognized that forest lands also provide recreation, water, wildlife, and other uses, and concluded that demand for these nontimber products and services and for environmental protection were of growing importance in the timber situation. Intensified forest management on nonindustrial private forest lands was given as one answer to solving timber supply problems.

Zivnuska (25) provided an economic interpretation of forestry as a means of analyzing broad forest policy issues. In discussing the government role in increasing the intensity of management and level of management on private forest lands, the author stated that the cost efficiency of current programs was very low. A reason offered was that the existing forest policy--as expressed in government programs--was not responsive to the basic constraints on investments in small forests. He concluded that changes in forest policy designed to change investment practices in forest production are urgently needed.

The role of educational programs in informing private-forest landowners of forestry opportunities was examined by a national task force appointed by the Extension Committee on Organization and Policy. Their 1976 report (9) examined existing policy and program emphasis in Extension Forestry. The task force recommended a renewed commitment to Extension Forestry that emphasizes public understanding of forest resource use; timber supply and harvesting; related forest uses for range, water, and wildlife management; and recreational uses of land.

In early 1977, the Extension Service started an evaluation of the Extension Forest Resources Educational Program (19). Each State Extension Service has listed its educational objectives and estimated results and impacts of its forest resources programs. These programs ranged in size from less than 1 to over 15 man-years per State, with an average of 3-1/2 man-years. The breadth of the individual State programs varied substantially. Extension's County Agent system was found to be a critical link in the educational activities. The national evaluation concluded that the potential of Extension's forest resources program is far greater than is now being captured. Every State expressed a desire to expand its program.

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APPENDIX C

USDA ACTIVITIES IN FORESTRY

The programs (and enabling legislation) of the Department directed to serving private nonindustrial forest landowners are:

Technical Assistance and Education:

1. Cooperative Forest Management Act of 1950

(16 USC 568c, 568d). Establishes the Federal-State service forestry program providing forest management and utilization technical assistance to private forest landowners, wood processors, and urban area communities. Administered by Forest Service.

2. Soil Conservation Act of 1935 (P.L. 74-46)

(49 Stat. 163, 164; 16 USC 590a-f). Technical assistance to conservation districts, individuals, and groups of landowners to reduce erosion and develop sound use of land and water resources. Forest lands are often intermingled with other kinds of lands. Administered by Soil Conservation Service.

3. Soil Conservation Service

(7 USC 1010-1011). Establishes Resource Conservation and Development Areas, local planning and decisionmaking bodies concerned with resource development. Administered by Soil Conservation Service with transfers of funds to Forest Service for forest resource considerations.

4. Watershed Protection and Flood Prevention Act (P.L. 566)

(16 USC 1001-1008). Assists local sponsoring organization to plan and install land treatment measures and structures to solve local flooding problems. Assistance on private forest lands is administered jointly by Soil Conservation Service and Forest Service.

5. Flood Prevention Act of 1944 (P.L. 534)

(68 Stat. 666, 76 Stat. 608, 58 Stat. 927). Assists local sponsoring organization to plan and install structural, nonstructural and land treatment measures to prevent and reduce flood damages on 11 authorized flood prevention projects. Activities on private forest lands provided jointly by Soil Conservation Service and Forest Service.

6. Agriculture Appropriations Act of 1896, subsequent appropriation acts and P.L. 74-46

Establishes a program to conduct all surveys on all lands. Administered by Soil Conservation Service.

7. Smith-Lever Act of 1914 as amended

(7 USC 341-349). Establishes a Federal-State cooperative effort providing education for the public in agriculture and natural resources. Includes activities directed to the private forest landowners. Administered by Extension Service.

8. Clarke-McNary Act of 1924, Section 4

(16 USC 567). Establishes a Federal-State cooperative program to provide technical assistance and cost-sharing for the procurement, production and distributions of forest tree seedlings. Administered by Forest Service.

9. Agriculture Act of 1956, Title IV

(16 USC 568e). Assists States to develop and implement a tree genetic improvement program and to reforest non-Federal public lands. Administered by Forest Service.

10. General Forestry Assistance (Organic Act of 1862, current appropriation act).

Provides specialized technical assistance to State forestry organizations to enhance their ability to serve private forest landowners and wood processors. Administered by Forest Service.

Forest Protection:

11. Clarke-McNary Act of 1924, Section 2

(16 USC 565). Establishes Federal-State cooperative program of forest fire prevention and suppression. Administered by Forest Service.

12. Forest Pest Control Act of 1947

(16 USC 594). Establishes program to protect forests from insects and diseases through cooperation with other Federal Departments and Agencies and cooperating States and Territories. Administered by Forest Service.

13. Rural Development Act of 1972, Title IV

Establishes a grant program to provide fire protection to unprotected or inadequately protected rural areas. Funds appropriated to the Farmers Home Administration which transfers them to the Forest Service for administration of the program through the States.

Financial Incentives:

14. Soil Conservation and Domestic Allotment Act of 1936

Establishes the Agricultural Conservation Program which provides cost-sharing funds to private forest landowners for tree planting and forest improvement measures. Administered by the Agricultural Stabilization and Conservation Service with technical assistance for landowners receiving cost-sharing provided by Forest Service through State forestry agencies.

15. Agriculture and Consumer Protection Act of 1973

Establishes the Forestry Incentives Program to provide cost-sharing with forest landowner for timber production measures on nonindustrial private forest lands. Administered by the Agricultural Stabilization and Conservation Service with technical assistance for landowners receiving cost-sharing provided by the Forest Service through State forestry agencies.

16. Farmers Home Administration Loan Programs

a. Farm Ownership loans assist eligible farmers to become owner-operators of family-sized farms, including developing or buying forest land.

b. Soil and Water loans assist eligible owners to carry out soil and water conservation practices, including forestation.

c. Operating loans assist eligible farmers to cover the normal costs of producing, harvesting, and processing farm products, including forest products.

d. Resource Conservation and Development loans assist RC&D Areas to develop, conserve, and utilize natural resources, including conversion of land to forests and the purchase of forestry equipment and services. Administered jointly with the Soil Conservation Service.

Forestry Research:

17. McSweeney-McNary Act of 1928

(16 USC 58). Establishes a forestry research program to solve forestry related problems. Administered by Forest Service.

18. McIntire-Stennis Act of 1962

(16 USC 582). Establishes a cooperative Federal-State research effort in forestry. Administered by Cooperative State Research Service through the forestry schools of State land-grant universities.

Forestry Planning:

19. Forest and Rangeland Renewable Resources Planning Act of 1974

(16 USC 1601-1610). Establishes a program to conduct an assessment of the national forest and range resources every 10 years and to develop a Forest Service program each 5 years. Administered by Forest Service.

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